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Geophysics, and the Defence Research Board, two surveys were established: (1) Eastern Arctic Summer Survey, and (2) Gulf of St Lawrence Winter Aerial Ice Survey. Observers were placed on board Department of Transport Marine Services northern resupply vessels, such as *C. D. Howe* and *d'Iberville*, and observations made of the distribution of ice and its relationship with climatic factors. A series of annual reports was published covering the Eastern Arctic ice observations.⁸⁻¹⁰ Arrangements were made through the Defence Research Board for special air observations from Royal Canadian Air Force aircraft at the time of each spring break-up of ice in the Gulf of St Lawrence, and this survey has been extended to cover the fall freeze-up. Flights are now made at approximately 10-day intervals during the winter. Originally, flights were made out of RCAF Station, Summerside, but during the winters of 1959 and 1960 they were flown out of RCAF Station in Rockcliffe. In addition to reports covering the yearly operations of the Gulf of St Lawrence Ice Survey¹¹⁻¹⁵ a glossary illustrating ice types in the Gulf of St Lawrence was prepared.¹⁶ In the fall of 1957 a network of shore-based observing stations was established in the Gulf of St Lawrence for the purpose of observing ice, and providing information for shipping.¹⁷ This network was expanded to a total of sixty observers in 1959 to cover the entire Gulf of St Lawrence area.

Special studies have been made from time to time. Sea ice conditions along the Hudson Bay route have been examined,¹⁸ and the Northumberland Strait area was studied to assess the possible effect of ice conditions on a proposed causeway.¹⁹ A preliminary report on ice conditions at Cacouna Island, and the significance of these conditions to navigation in these waters, was prepared.²⁰ Observations were made on frazil ice in the St Lawrence River in the vicinity of Quebec.²¹

Apart from floating ice some work has been done in the related fields of glacial ice and permafrost. Cryonite phenomena on the Greenland ice sheet in the vicinity of Thule were described in some detail.²² A study of the origin and distribution of permafrost in Canada was published,²³ and studies of temperatures in permafrost at Resolute, particularly in the active layer, have been made.^{24,25} A selected bibliography bringing together all important references to permafrost in Canada has been published.²⁶

In the summer of 1960 geographers from the Geographical Branch working with the Polar Continental Shelf Project propose to undertake a series of investigations of land and sea ice. The sea ice distribution in the area adjacent to Ellef Ringnes Island will be studied, and work initiated on ice physics problems such as the correlation of ice distribution with water temperatures and salinity. The use of various concentrations of ash and other materials to accelerate the rate of ice melt through the heat absorptive capacity of a dark surface will be assessed. In addition, studies will be made of the insulating properties of the various materials on ice to prolong its usefulness as an airfield, etc. Glaciological studies lasting several years and embracing several aspects of geography, geophysics and biology are planned for the ice cap on Meighen Island. Investigations on permafrost, both on its distribution and on its physical properties, are to continue.

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JOURNAL OF A WHALING VOYAGE FROM DUNDEE TO DAVIS STRAIT, 1894

[Edited by Anne Savours, Scott Polar Research Institute.]

INTRODUCTION

This account of an Arctic whaling voyage made in 1894 was discovered among the papers of the late W. S. Bruce, in the Royal Scottish Museum, Edinburgh. Bruce and the author, a sailor named Redgrave, had sailed together in the *Balaena* during the cruise of the Dundee whalers to the Antarctic in 1892–93. Redgrave probably wrote the account at Bruce's request.

The late nineteenth century saw a rapid decline in the Scottish whaling industry. By 1880 the Greenland Right Whale (*Balaena mysticetus*) was nearly extinct from overfishing, and whaling ships were obliged to make up their cargoes by capturing Narwhals, Seals, Walrus and Bottle-nosed Whales (*Hyperoodon rostratus*). At this time the Norwegian method of using small steamers and harpoon guns began to supersede the old method of fishing from whale boats launched from a parent vessel. Redgrave's log is therefore one of the last accounts of whaling under the old conditions.

When a whale was sighted, two boats, manned by the watch on deck, were sent after it. As soon as the "fish" was struck by a harpoon, a flag was hoisted to show that a "fall" had been made. Additional harpoons from both boats were fired when the whale reappeared after his sudden dive on being struck. The *coup de grâce* was given by lances or spears, and the whale towed back to the ship for flensing, or "flinching". The blubber was later "cranned" or freed from "kreng" (rubbish: from the Dutch word meaning carrion), cut up and transferred to the tanks below. This latter operation was called "making off".

Eclipse, in which the voyage was made, was built in Aberdeen for Captain David Gray of Peterhead in 1867. In 1891, 2 years before the Peterhead whaling industry closed down, she was sold to Dundee, where the importance of oil to the jute industry kept whaling alive until 1909. *Eclipse* measured 149 ft. in length and her gross tonnage was 436 tons. Her engines had a nominal power of 69 h.p. She carried eight whaling boats, each with a gun mounted on the bows, and carrying 600 fathoms of $2\frac{3}{4}$ in. whale lines. Captain Milne, who captained the ship during Redgrave's voyage in her, continued in command until 1908.

The *Eclipse* still appears in Lloyd's Register of Shipping as the *Lomonosov*. Since 1914 she has been in Russian service as a research vessel, registered at Archangel. Lloyd's were unable to confirm that the ship is still seaworthy, owing to lack of data from the USSR, and her name is to be removed from the Register in 1961. She was certainly afloat in 1932, working from Petropavlovsk. The fact that one of the new Soviet oceanographic vessels has been called *Lomonosov* inclines one to think that the old *Lomonosov* may by now have been broken up.

The journal is published by permission of the Director, Royal Scottish Museum. Among others I have especially to thank Mr Richard Milne of the Peterhead Library and Arbuthnot Museum for his most kind help.

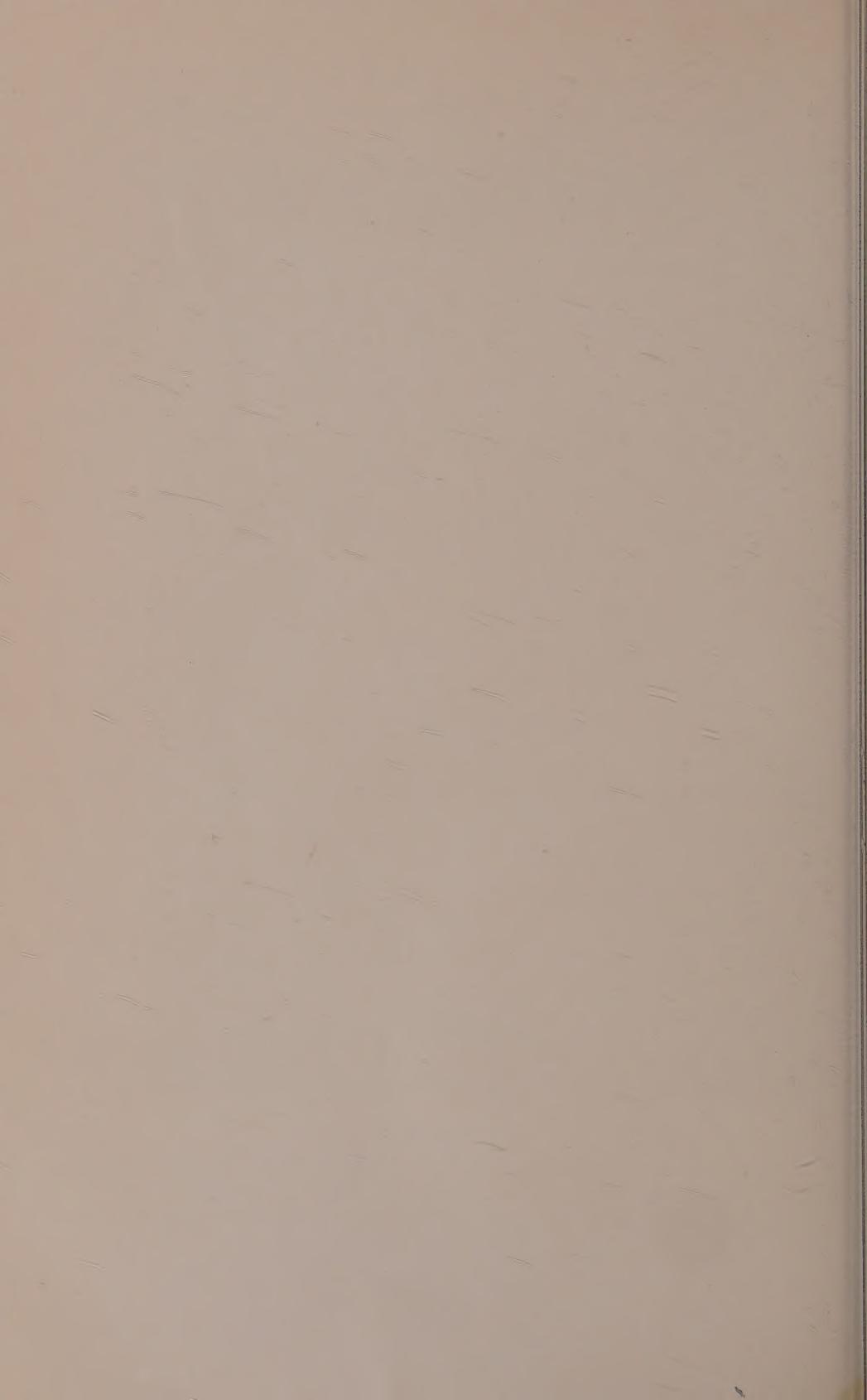
REDGRAVE'S LOG

On March 20/94 I made my second venture as a foc'sle hand and will try and give you a description of how I fared and what I saw. I mention March 20th as that was the day I signed on. Like most men of elevated position the

Eclipse in Dundee, 1900



(Facing p. 126)



Capt'n. thought it would add to his dignity by keeping we men waiting about the doors of the shipping office from 12 to 4 pm till he thought proper to put in an appearance to see us sign on. Perhaps he was in Co. with the near Dram shops and thought if he turned up earlier it would spoil their custom. Nevertheless we managed to get finished agreeing (voluntary of course) to mere Merchant Seamen's wages; for tho' we take lower monthly wages and a share? in the profits, the sum total does not equal more than the regular sum of wages;—and the, for a cold climate, starvation allowance compelled by a generous Board and a *good deal* at the owners option.

We were due on Board the next morning at nine and being a conscientious man, I turned up punctually having taken my chest and kit on board previously. When I went below I found the usual crowded state of affairs, tho' this time more with the crews Kits than extraneous matter; for we possessed a small foc'sle for a crew of 36. It was really a case of climbing over chests, kitbags, bedding, etc. I remained on board except for a short hour for lunch: having luckily secured the only unclaimed bunk and that in the half deck; and watched the arrivals of my confreres. As the hour of departure drew near for us to make a move, I ventured below and words fail to describe the Bedlam. Each man seemed during the morning when he came on board to have forgotten something and had to go and fetch it, which necessitated several journeys. But as they returned frequently empty handed, I fear it was that drop of whiskey at the bottom of the glass they forgot—For it seemed to me, as I leaned against the port Bulwarks and watched that wondrous dance, that their manner of getting on board seemed more awkward each time. Nevertheless all managed, and a few more as we found out afterwards, to get on board safely and we hauled of the, I think, Lord Elgin dock at 2 pm and began, to me, a memorable voyage. I suppose to men who were in such good spirits, or I should rather say had spirits in them, and crowded in a small place that they would be rather in each others way and given to chaffing each other, for the noise that came up the hatchway was terrible; at least it soon got so, for there were dull thuds and strong language mingled and not only were these mingled, but on going below on duty, I found the crew an undistinguishable mass; it seemed that heads, arms, bodies and legs belonged to anybody and so crowded was the "companion" that my return above had to be made by getting on the galley and heaving myself up thro' the cooks booby hatch. After a time they seemed to have found it too warm, I suppose, below and brought their bruises and blood on deck and began to try and paint each other vermillion, and not content with amusing themselves began to attack the officers. I thought it time to interfere then, as for my own personal safety I declined to see the "Navigating Lieutenant" maltreated. I fear I have wearied you with this long account of a disagreeable subject, but I wish you to see how ships put to sea and the wonder really is how more are not lost, and I end now by saying three good days is only sufficient for the men to "come round".

We were of course under steam and luckily had a light fair wind. Off Broughty Ferry we dropped the owners and 7 stowaways, and managed to set

fore and afters and then were actually off. Tea the first night consisted of water and biscuit as things were not squared up. The carpenters bench made a fair bed. Passed Peterhead about 12 am. We had fair weather, only meeting a tumble in the race off Stromness, until thro' the Pentland Firth when we met a blow and tumbling sea and had to reef down. As soon as Neptune proved his sway, the majority resorted to the bulwarks to see what colour the water was or held their heads over bucks to examine the bottoms. The weather continued much the same, tho' the crew improved, until the 28th and 29th when we had to "Lay to". I had the curiosity to measure my bunk and find it $2\frac{1}{2}$ [feet] high, 6 long and 3 ft. Broad; this was made to hold myself and one other twice my size. I may here mention that the bunks generally held 3 in them, some four—but of course some of the men were in different watches. But a mighty squash when it was all hands in, as it was in the full fishing;¹ moreover I should say the ceiling was a good six inches lower than in the Balaena and I often tryed to see whether Iron beams were stronger than my cranium. We had a taste of cold snow showers during this period but the weather gradually lifted till the 3rd April when we had quieter but colder weather. All the time of course we had wet decks which was unpleasant. We had now what was called mild weather in comparison to last year, yet sticks had to be brought forth to clear the ice off the ship and shovells to clear the snow off the decks. On the 5th we got better weather but still cold and passed several Icebergs. These are very unlike the Southerners, not nearly so big, of more fantastic shape, also the colours are of a more delicate tint.

By the 8th we were what is called "in the Sou'West"—that is off the Labrador coast, gradually working up north looking after Bottlenoses. We frequently saw Northern Lights but no true aurora. The former seem to shoot up from the horizon or from behind clouds towards the polar star and are very like a succession of search lights. We found they generally foretold bad weather.

The crew were, when they got all right, a much more respectable and tidier set of men, but I think they beat the Balaena men for a foulmouthed and profane Blasphemous Lot. Of course there were a few good ones among them. We got coffee beans and roasted and ground them ourselves. Potatoes lasted till the middle of July, and when we had had a hard days work we got a glass of grog. Also we had Salt Cod (Dry) served out for about 4 months. Then of course we could help ourselves to seal or bear etc. for fresh meat and with one wacking [share] out of deer; these were the only difference between ours and the Balaena grub. Whilst I am on this topic I may say that we had to borrow the last months biscuits from a Yankee ship. The Tea and Coffee only just served us to get home. Our last butter was served out Sept. 27th as also marmalade. By 28th Oct. the Currants and Raisins ran out so we had plane Duff or "Cookies" instead. Two months lime juice was also stopped and so by the time we got home we were a scurvy ship.

We had off and on sort of weather till the 9th when we were reduced to reefed Topsails. The temperature below being 36° . During the week we saw our first sword fish and the nights began to get into days. On this Wednesday

¹ Sea watches were not always kept while whaling.

I find we got our boats out and our gear with them, and as the wind was blowing cold and strong, we were continually taking small seas on board it was lively work, and curiously enough, canvas which had been added during Tuesday, because it was a calmish day, was not reduced till all the gear etc and ship tidied up had been done, but as Grog was served out afterwards it stopped the grumbling.

I find I notice for the first time the "Loom" or I rather think it is called the "Diver". In size, shape and colour it is exactly like the small penguin, tho' of course it has true feathers not like the material the Penguin had; and has wings instead of Flippers. We had also the "Burgomeister" a small kind of Albatross, the Molly hawk, rather smaller than the Southern kind more like a greyish Gull or Curlew. Then when we got thro' the Bay¹ and to the Western side, we had kittiwakes, Rotchies, Dovekies, Ducks and a few geese and of course Snowbirds. These are all a small tribe Rotchies, Dovekies, generally Black and White, Ducks more of the Malard race and geese Black and Grey.

On the 28th we killed our first fish, a Bottlenose—Dull grey colour and only good for Blubber. They are much more rapid in movements than the Black Whale, very seldom still, and consequently want a lot of rowing and dodging after. We continued to fish for a day or two but only managed to get three and we were all very thankful we didn't stop longer. The following I relate to give you an idea what our Captn. was like. On the last day we had been off from 6 am till 1.30 just back twice to the ship for a mouthful and the weather had become rough. Some more fish were seen and the Boss asked if it was too rough; of course the men could not say no, so off we set again and when we got free of the ship found we could not pull against the wind, and had to easy for nearly every other wave we met, else we should have filled her; this game was kept up for an hour or two and the ship had to come up to us. Then instead of putting the ship about, so as to give us the lee side, we were told to hook on. You know what boats blocks are like, and when you can imagine a boat rising and falling some 5 to 6 ft. on the windward side it is no joke; as we came alongside the foreward Block got in the boat and just as it got to the bows the boat fell with the wave and the hook jammed in the seacraft (the narrow beading running just below the Thowles fore and aft) and neither hook gave way or seacraft, and if an extra high wave had come we should all of gone in, but the spectioneer by dint of hammering with a malet got the hook adrift—of course in all fishing adventures you must remember the exciteable state of everyone. This is No. 1 escape for yours truly. After this we left for the Eastside [of Davis Strait] and the voyage became a bit more pleasant as we were constantly in sight of Land or Landing. During this week we had also the coldest day viz. 20° of Frost but a dry cold on the 29th.

We reached Kyingtoffen² and dropped anchor. Here was my first introduction to the Yaks. (Esquimaux) but as the Eastside is dotted with Danish settlements the true Yak has gone and certainly a very decent half bred left. There manners are good and I heard no rumour of theft. They are cleanly and

¹ Melville Bay.

² Probably one of several settlements with the name Kingigtoq, south of Godhavn.

well dressed tho' of course in skins. The Land reminds me awfully of the Norwegian coast, tho' of course this is barren, just bare grass in the hight of summer and a few cranberry bushes. The whole time we were in the country it was more or less covered with snow, it being one of the worst seasons experienced. The rock looks principally like Grey and Red granite, and occasionally that grey slatey kind of rock met with on the sea coast. In some places there was sand and gravel. The beaches some very shingley. The East side people puzzled me, for there is an immense I feel sure, proportion of Eastern nature about them. Their features are the flat mongolian type with celestial eyes. The hair, on both sides is of the Black Gypsie hue with a shot of Blue in it. The east-side women in features, form and limb and carriage are Chinese or Japanese to a "T". The peculiar waddle, small feet and hands, the Grecian head, are all of the Celestial type. The flat faces, almond small eyes etc. The men wear skin jackets with a hole for the head to go thro' and skin trousers, these with the hair on. Thin leather, without hair, sort of shoe boots coming up to their knees fastened at the top. The ladies much the same jacket, but fitting tighter and more ornamented shorter breeches and boots half way up their thighs. Their hair is all brushed up and formed into a Topknot on the top of their heads tied with different coloured ribbons. They all wear flannel underclothes. There is a Governor in General over all the settlements and each settlement however small has its head man usually called "Governor". The Danes send out a ship (S.S.) every year which usually arrives about the end of June to a place called Leevely¹ or Götthaven [Godhavn] where the produce is collected ready for shipment. The country is very fine in effect, as you have rock, some high some low, mostly rugged coming down to the waters edge. At this place we watered and we had to carry the empty casks up and down dale (frozen and snow), some $\frac{1}{2}$ mile from the shore and roll the full ones down. It was a tiring job. The children are clothed the same as men, and with their hoods on look like baby seals. Of course bartering is the only negotiation and it is curious to see the values. Small skin baccy pouch for 1 plug of baccy. Footstools for Biscuits, mats for Jam or Tea or Coffee and of course Biscuits etc. for the other things according to the mind of the seller.

We continued to coast along, occasionally stopping near settlements, until the 20th May when we left "Leevely" to try our luck thro' Melville Bay, "That Death Trap". But on our road we had 24 hours at the Walrus. I mean out in the boat. Never back to the ship. We only had this day as the ice began to make afresh. On the 24th we got hemmed in. To our right some miles away lay the snow clad land with occasional patches of rock showing in front on the left and astern nothing but hard ice floe. Not the broken patches of the Southern Seas, but comparatively smooth solid hard ice as far as the eye could see anyway. It was certainly novel, but a pitiless enemy to contend with. The tints of course are various, and run from grey, blue grey, and various tints of purple, and the holes of still water showing perfect reflections make one think they are dells. Up to June the 20th we were chiefly hemmed in, or if we could get a move it was very small and only gave us the opportunity

¹ Spelt Lievely in other British narratives.

of trying what the Eclipse was made of, as we generally began ramming and backing the ship to try and make a bigger hole and rolling ship at the same time. But altogether we made very little progress. Eventually we got a release and got as far as the Duck Islands¹ when grand preparations were made to gather eggs. The excitement was nearly as great as if it was fishing time. As soon as we hooked on to the Floe Fore there was always the Land Floe to hook on to. All boats were lowered and a rush made for the three islands and after 4 or 5 hours, toiling up and down rocks with a bucket we rejoined the ship and found it just ran to about 4 or 5 eggs apiece. A regular farce. After several attempts and being frequently blocked we managed to reach Cape York [Kap York] (the northern boundary of Melville Bay) by the 1st July. You must not suppose we had the splendid weather usually depicted in Arctic pictures, but for the most part dull grey skies with shifty winds and more or less cold as it blew N. or S., also snow, or wet sleet showers, and occasional mists. We managed to finish the last 10 miles to Cape York in about 5 hours steaming (nearly as good as the Balaena that memorable night down south. 1 mile in 6 hrs) but this was not weather but ice.

Here we encountered the *true* Yak and if you ever want to see the lowest state (or stage I suppose I ought to say) of humanity go there. For a more forlorn, filthy in person and habits and simple lot, I should say it is hardly possible to find anywhere. They still retained the same apparent Celestial descent but both sexes were clothed, firstly a seal or deer skin jacket next the skin, hair inside, over that usually a deer skin, hair outside, a pair of breeches made of Bear skin and the leathern shoe boots. Every "Coolietan" (i.e. jacket) had a hood and the women's an extra big one to carry the children in. The Coolietans fitted loose and the band of the breeches just above the hips tight and when either sex stooped down, or stretched their arms up, there was a ribbon of *Dirty* tawny flesh showing. These people did not understand the use of soap. Inside their "Cummings" (i.e. leathern boots) they wore a short pair of socks made of skins, hair inside and over these a pair of stockings, same make, and stuffed the foot all round outside these with dry grass. It seemed to me that they never put on others or new togs etc. till the old ones began to drop off. I suppose necessity is the mother of invention, for beyond the usual heathenish method of one friend relieving the others head of irritating matter and feeding at the same time, they found it too difficult, where buttons are unknown, to get their hands underneath their garments, they with the usual cuteness of savages had invented a very useful instrument. It was a short stick with a bunch of hair fastened at the end, and this was either poked down or up the garment according where the enemy was and twirled round 2 or 3 times and then withdrawn and I dont think I once saw them fail to capture the enemy, Of course, I suppose that as he had been feeding on them, it was only fair for they to feed on him. Such creatures were allowed; nay almost invited, on board and permitted to roam whither they wilt. They certainly had the best dogs we found in the country. It is curious but these

¹ Edderfugleøer, southwest of Nugssuaq.

creatures dont smoke and hate the smell of it. I rather fancy that very few ships call there and thus the reason of the condition of the people.

I find that on the 5th July we beat the Balaena record, for in 4 hours we managed to move about 100 yards and then no farther. On the Wednesday following we managed to gain open water, a feeding ground for Looms Dovekies etc., myriads, but we steadily progressed until thickness, almost to be felt, set in and the compass having a game of spinning on its own account compelled us to pull up and hook on. Next we got clear and pulled up for a spell in "Dudley Diggles" Bay.¹ I mention this because "Nilsson" here got his best results of all his trawls. After spending a few hours here we again moved on and in blinding wet sleet and loose ice for a time lost ourselves but eventually brought up off "Rumble Rock".² A high solitary rock at the entrance to a Bay, where all boats were again lowered for eggs and this time with a little more success. From here we went, meeting chiefly loose ice, so made fair progress across the straits stopping at Carey Islands [Carey Øer] where Mr. Nilsson landed and brought back part of an old sail, some leaves of a Norwegian book and a tin of empty specimen bottles; the remnant of the illfated men who about 2 years ago bought an old schooner at St. John's to go on a scientific voyage up Davis Strait and got wrecked and lost. They were Swedes or Norwegians. Nilsson might have discovered more, but filthy blubber and lucre forbade a waste of time.³ On the 8th we got our first fish, right sort, in the evening. The boats were lowered away at 6 and we did not get to bed till 4 next morning. The bone was 11 ft. 9 and about 20 ton of blubber. The skin is a blue black; the Fat sometimes pink but generally of a creamy white. On the Thursday we got another and did not finish cutting up etc. till 6 p.m. on Friday; then we were off after another, it having fallen a dead calm and thickness coming on, and did not get back till 2.30 a.m. on Saturday morning, as we kept following it till we lost sound and sight of it and ourselves into the bargain. A cold raw and thick morning accompanied by rain and snow. On Monday the 16th our watch was on deck at 4 a.m. and, as there was a lot of loose ice and hardly any wind, we had no rest as we had to tack and eventually half had to go off in a boat and tow the ship whilst the other side worked the ship. At 7 a fish was seen, at 8.30 it was killed and it took till 9.30 p.m. to cut up and stow below; then we went below but at 11.30 another was sighted, this we got alongside by 4 a.m. on Tuesday, then with time for meals we worked till late on the evening when another was sighted, so on again and killed and got all stowed away and cleared up main and tween decks by 6 p.m. on Wednesday, altogether about 87 hrs. with 7 hrs. sleep and thus made our fifth and last whale. The bone ran from 10 ft. to 12 ft. good haul and oil about 85 ton altogether, bones about 4½ ton.

¹ Presumably the bay north of Kap Dudley Diggles, a good natural harbour with no official name.

² Unidentified. Possibly Conical Klippe.

³ Elias Nilsson sailed in the *Eclipse* specially to look for the missing expedition. Trace of the two young Swedish naturalists Björling and Kallstenius had been found on Carey Øer by the whaler *Aurora* in 1893 (see *Geographical Journal*, Vol. 3, No. 1, 1894, p. 63-64). Nilsson enquired of the Eskimo at Kap York and on Baffin Island but learned nothing. The expedition was presumed lost. (See *Ymer*, 1895, p. 182.)

When a fish is seen, there is dead silence and everyone speaks in whispers, then at the option of the Captn. 2 or 4 boats are lowered and away they go, for it is 5/- per man for the boat that gets the first harpoon in. One may be able to get up to him easily, but more frequently it is a case of rowing hard after him for $\frac{1}{2}$ hr., then being on your oars for some time to see where he will rise again and so dodging him until you can get close enough to get the gun and hand harpoon in, when away he goes with the line and you sit still and let him tow you where he likes; a second boat is generally handy to put another harpoon in or, if he should take all your line, to bend on to theirs. Then the other boats come up and give him a rocket and lance him until he yields up the ghost. As soon as this takes place he begins to sink, so you have to be handy, for if he goes down it takes 12 or 18 men *some time* to pull him up again, and hitch the harpoon lines round the bow bollards, then a line is passed under and round his tail and made fast to the boats and the procession tows him towards the ship, which has in the meanwhile got up steam and is bearing down on you. The original lines are cut from the harpoons and the first boats crew begin to pull in. If he has taken out all your lines this means time and work, and wet ropes are not pleasant to handle. When the beast is got alongside, he is made fast amidship his tail at the fore rigging and his head at the chains. Having been well secured, every one goes below for a sup and bite and change their togs and then begins the cutting up. A section of experienced men set to work at the head and some at the tail. The tail men cut up, as it were, long fillets which are sent on board, these by the crowd on deck are cut up into huge blocks about a yard square and sent below. The tongue and jaws etc. the same, and the bone is sent up each side separately in toto and split up on deck. All this takes about 6 hours. When done all go below for rest and if no fish is sighted or weather unpropitious for fishing, after a day below the fat is fetched on deck, cranned, skin cut off, and the blubber chopped up small and sent into the tanks. This will take generally about 6 hours. The decks are then cleaned and the ship cast off and away for more fish. Of course during the period previously mentioned, we were off constantly after fish but only managed to hook the five. We remained another week at the middle fishing, but saw nothing further so we left and went off for Deer and salmon. During our cruising we passed a floating carcase of one of the whales we had flinched and it was surrounded by bears gorging themselves.

Now began the time to look out for Bears and Seals and we managed to get a few of them. The seals, as you will have noticed at the [Royal Scottish] Museum are different to our Southern Friends. We cruised along the Land Floe which reached nearly 20 miles from land until the 23rd when we hooked on off "Button point". It is I believe at the south entrance to Eclipse's Sea [Eclipse Sound] near Bylot Island or Ponds Bay [Pond Inlet]. Hence we came across, or rather was boarded by the best of the true Yaks, fairly clean and tidy, but there was none of the Celestial stamp about them, taking more after the North American Indian tho' smaller in stature. They wore much the same kind and cut of garment, only the Ladies had a long tail hanging down back and front. On the 29th I forgot to mention that we were practically becalmed.

A clear blue sky, perfectly still dark black Blue water and a few small ice patches floating, a lovely day especially for a Sunday. Not a sound, a perfect day of rest but not to a whaler, for in the morning a boat was lowered for seals, no go, and when we came on deck at noon away we went, *one* seal having been sighted from the mast-head. I believe below the horizon, for we pulled till the ships were Topsails down and then only just got to the outside of a small stream. It was warm and seemed a sinful work to disturb such calm water. A bird flying was so perfectly reflected that it was almost difficult to tell which was the reality or reflection, as the few hummocky patches of ice and distant Icebergs seemed fathomless by their reflection, not being able to tell the water line. As the ship could not come to us we got back at 7 pm with *one* baby seal. Towards evening a slight thickness arose and made the whole thing seem enchanted—except for having about 2 hrs. hard pull for your tea—on the 1st Augt. the sun at 12 am (midnight) just touched the water, so we rejoiced as the “Fall” was coming to give us dark nights and certain rest. I must have improved for I find during this week I had a four hrs. continuous heaving coal in a Tank all to myself. To show the power of moving ice, we had hooked onto a picturesque berg, a lowish ridge on our side, tho’ high enough to make carrying water hard work, then a small plateau and on the other side it ran up to nearly 100 ft. of course all very rugged, and whilst we were hooked on (broadside) with a small wire warp on our Port bow and a whale line off the starboard quarter, a patch came slowly floating by; it might of accommodated about 100 people, for size; caught our bows and when the pressure came both warps went with a crack and we were left on the berg whilst the ship manoeuvres to get free. The wire warp was fast to an Ice anchor and the rope warp round a hummock. We were eventually fetched off by a boat. I see we had a big wire warp out as well, but this anchor jumped out of its hole.

By Augt. 19th we had, after various blockings, managed to get up to the North Entrance to Eclipse’s Sea in Navy Board [Inlet], but could not get far as the floe stretched right across and was too thick to break up. For the most part of the time we had lovely weather, the sun quite burning, but when it was the other thing it was unpleasant, as we generally had a gale with cold wet snow. We journeyed there to try and get to our Salmon rivers but after trying the south entrance later on and again the north, had to give it up as a bad job and go without some fresh fish—worse luck. If ever you go to the country, be wary of distance as calculated by a “Yak”, for if he says it is “Cannytuckiloo” (of course I spell as pronounced) which means “not far” you will have about a 5 hrs. hard walk and what his distance is when calls it “Washipook” which means a good distance—I should say it is so. The above remarks are called to mind by the following: whilst hooked on, a “Yak” said there was a deer “Cannytuckiloo” which had been killed, so volunteers were called and a boat sent ashore, this was at 9 am. “We should only be gone an hour or so.” The carriers went off and left another man and myself to stand by and we *stood by* till 7 pm. when they return. So after that I was chary of “Cannytuckiloo”. Of course we had nothing in the boat. Nevertheless as next day was Sunday we were allowed to miss a watch, but worse luck a berg

came down on us; of course we had no steam up, so all hands had to turn out, in any costume, and man all boats to tow the ship out of the way and we *just* did it. Adventure No. 2. It was a fine sight to see the beggar come slowly and majestically on, and when he reached the floe where we had been hooked on, calmly plow his way nearly half his length thro'. I forgot to mention Navy Board [Inlet] is up Lancaster Sound (another death trap).

On 16th we were after walrus and the specky [spectioneer] had shot one some distance from the boat, and the rest of the crew went to flinch, leaving me to shove the boat thro' the ice, but it came in so fast I soon got jammed, and then I went to help the rest and it took all of us to drag half a skin back to the boat and on dragging the 2nd half I got in and saved myself by clinging to the ice and a friendly hand. But it was awfully cold as we could do little rowing and the ship had to come and pick us up, which it did after about two hours. Adventure No. 3. Thankfully to say after a grog on board, I felt no harmful results. Saturday Aug. 26th we had a mock sun but it was after sunset and in thickish weather; it looked to be about a couple hundred yards above the horizon, a yellowish tinged white and not much bigger than its reality.

Sept. 2nd began our Rocknoseing, which means being off at day light in the boats and coming back at dusk. We each take our own and take coals and wood and a sort of iron basket to make a fire in. Then we usually row out of sight of the ship and hook on to the shore and the Bow oar gets as high as he can and looks out for fish whilst we wait in the boat. As long as it is fine weather and a warm sun, it is delightful but if you have a cold frost or wet, it is murderous. The ship all the time remains anchored in a bay, bight or inlet; sometimes for a week. The hands turn in all night; a watchman is set as anchor-watch. Sept. 4th after cruising about we had to run for shelter from a southerly gale into "Eric Harbour", so called because it was discovered by the Capt. of the "Eric" (Capt. Walker) in 1876 and is in 68 N 65 W. It is not a big bay and narrowish, but fine high mountains each side shere down to the water's edge. These are of a dull grey colour with just here and there a tinge of yellowish red. But snow hid the best part of them. Again we shifted berth and on Tuesday put into Coutt's inlet. This is a fine inlet with several outlets beautifully land locked. It seems as if Providence knew the straits etc. were an inhospitable place and so made these harbours of refuge for the poor sailor; but I dont think it thought they would be put to *such* use. Nothing could be more delightful than a three summer-months' cruise in these waters. *No fishing* of course.

On the 7th Sept. we lost our cooper as you will have seen by the papers. He had been ill for a long time and if he had been on shore and the authorities had seen the way he was neglected, there would have been a fine shindy. Tho' of course not much can be done on a whaler, and no whaler ought to go to sea without a Dr; yet a more heartless case of neglect I hardly know. We buried him on the 15th, as we could not get ashore for surf and of course when ever we are not at anchor in an inlet but cruising about, we are on the look out for fish and are frequently lowered away, but all to no purpose. Whilst off

Ponds Bay, Mr. Nilsson got out his trawl and got some good specimens, but as you have seen him no doubt he gave you the correct names. I can only describe them as small (all of them) spiders with long legs, long leg starfish shrimps, a sort of shrimp spider, a scallop with transparent shells, a sort of alligator grasshopper with young sticking to his legs like the dead branches of trees and of course a various quantity of sorts. This a very vague idea, but it was awfully interesting. I often wished you had been in [together?] you two [would] have enjoyed yourselves. Or should I say revelled. We occasionally varied the monotony of Rocknoseing by trying to get Narwhals or Unis as they are called and lively work it is, as they are very quick in the water and soon get a sight of you, and unless you can get them end-on you have not much chance.

On Sept. 21st early morn we had Adventure 4, for we had no inlet to get into on Wednesday or Thursday night, so had to cruise instead and feel the effects of cold gales and damp calms, and it was during the latter, on a southerly course we managed to just scrape by a berg, our keel grazing the tongue of a Berg. There was hardly any wind and the Harpooneer had not calculated enough for drift. We continued to cruise southerly and occasionally put in for the night till off Exeter Harbour [Exeter Bay or Sound] and I think should have gone in and squared up and off home, but the Capt. of the Aurora an awful Blackguard, excuse the expression; and a great chum of our Captains persuaded him to go to Cumberland Gulf [Cumberland Sound] so off we set and got there on Oct. 10th, anchoring in Ingatlack Harbour,¹ about 7 miles from Black Lead [Blacklead Island]. This is a settlement of Peterhead men who keep the Yak for their fishing and hunting and send their produce home every summer in their own ship which comes out each year.² And here we remained, with the exception of a short cruise up the Gulf till Nov. 4th., when the ice drove us away. We were at once boarded by a cargo of Female Yaks called Koonies and for the whole time every man had his Squaw. It was positively sickening. If people call that whaling the sooner it is stopped the better. As you may suppose the weather was awfully bitter and we were lowered away nearly every day for Rocknoseing frequently without the ghost of a chance of Fish in all kinds of weather (Frequently I think simply for show). During our cruise up the gulf, we were nearly all sent to Davy Jones one night. No steam handy as usual. We were under sail with a fair wholsail breeze, and a dark night. When land was reported on the starboard bow; it having been all along on the Port. The ship was at once put about and just saved the rocks by about 5 minutes; but as long as there were Coonies about it did not seem

¹ Possibly on the shores of Nianto Harbour. Various authorities, including the Canadian Board on Geographical Names, were unable to identify this place-name.

² A Peterhead fisherman, Mr William Forman, remembers the old whaling days. He tells me that the custom grew up, at the close of the Dundee and Peterhead whaling era, for one or two members of the crew from each ship to winter in Davis Strait. They lived in Eskimo settlements and organized the hunting of bears, walrus and narwhals until the return of their ship in the spring. One Peterhead man, Fred Cameron of the ketch *Albert*, spent the 1914-18 war with the Eskimo, and was not relieved until 1919, when he heard for the first time of the war. At least until the early 1920's, ships from Peterhead collected produce from Cumberland Gulf. The old whaling station on Blacklead Island is marked on Canadian Hydrographic Service chart 7051 at lat. $64^{\circ} 58' N.$, long. $66^{\circ} 18' W.$

THE ARCTIC ZONE OF INTERNATIONAL INSPECTION PROPOSED IN 1957 AND 1958

[The Antarctic Treaty (see p. 157) provides for the total prohibition of military activities south of lat. 60° S., and for an accompanying system of international inspection. This revives interest in the unsuccessful attempts to introduce a system of inspection in the Arctic under the auspices of the United Nations in 1957 and 1958. In order to report these developments with impartiality, we reprint below the relevant summaries from the *Yearbook of the United Nations*, 1957, p. 4-5, and 1958, p. 16-18.]

Western Powers' proposal of 2 August 1957

On 2 August, Canada, France, the United Kingdom and the United States submitted a working paper [to the United Nations Disarmament Commission] on systems of inspection to safeguard against the possibility of surprise attack. As a safeguard against the possibility of surprise attack, the inspection system would include: (a) aerial inspection; (b) ground observation posts at principal ports, railway junctions, main highways and important airfields; and (c) mobile ground teams with specifically defined authority.

The areas of inspection were described in the Western plan as follows: (1) All the territory of the continental United States, Alaska, including the Aleutian Islands, Canada and the USSR. Should, however, these limits be unacceptable to the USSR, the alternative would be an Arctic zone to include all of the USSR, Canada, Alaska, Greenland and Norway north of the Arctic Circle, in addition to a sector west of longitude 140° West east of longitude 160° East and north of latitude 50° North, the remainder of Alaska, of the Aleutian and Kuril Islands and of the Kamchatka peninsula. (2) If the USSR were to accept either of these two zones, an area of inspection in Europe would be added to cover the territory bounded in the west by longitude 10° West, in the east by longitude 60° East and, in the south by latitude 40° North. If however the USSR were to reject this zone, a more limited inspection zone in Europe could be discussed on the understanding that this would include a significant part of the territory of the USSR, as well as the other countries of Eastern Europe.

[This was not approved.]

USSR complaint concerning military aircraft flights in Arctic area, 1958

On 18 April 1958, the USSR asked for an urgent meeting of the Security Council to consider the question of "urgent measures to put an end to flights by United States military aircraft armed with atomic and hydrogen bombs in the direction of the frontiers of the Soviet Union". In its request, the USSR recalled the Council's primary responsibility for the maintenance of international peace and security and stated that the threat to the peace involved made it imperative to consider the question without delay.

The Security Council considered the matter on 21 April and at four further meetings on 29 April and 2 May.

On 21 April the USSR submitted a draft resolution whereby the Council would call upon the United States to refrain from sending its military aircraft carrying atomic and hydrogen bombs towards the frontiers of other States for the purpose of creating a threat to their security or staging military demonstrations.

In a supporting statement to the Council, the representative of the USSR drew

attention to reports to the effect that unidentified objects appearing on the radar screens of the United States "distant early warning" (DEW) system could be mistaken by American military personnel as indications of hostile missiles or rockets. This made the recent United States practice of flying military aircraft with nuclear weapons through the Arctic regions in the direction of the USSR particularly alarming. If such flights were not broken off early enough, or if they provoked counter-action, catastrophe might result.

The Soviet Government, he added, regarded these United States actions as provocations against the cause of peace. They were particularly untimely in view of preparations for convening a conference of heads of Governments in order to remove the danger of a new war. They were also inconsistent with the resolution on the "peaceful co-existence" of States adopted unanimously by the General Assembly in December 1957. The Soviet Union, which had reduced its armed forces and unilaterally discontinued the testing of nuclear weapons, demanded that the United States should immediately discontinue the provocative flights.

In reply, the representative of the United States rejected the USSR charges as untrue. The United States, he said, was merely complying with the inescapable requirements of legitimate self-defence. It had to guard against the possibility of surprise attack. Flights of the Strategic Air Command were not provocative; they were launched in a carefully planned and controlled way and could not be the accidental causes of war.

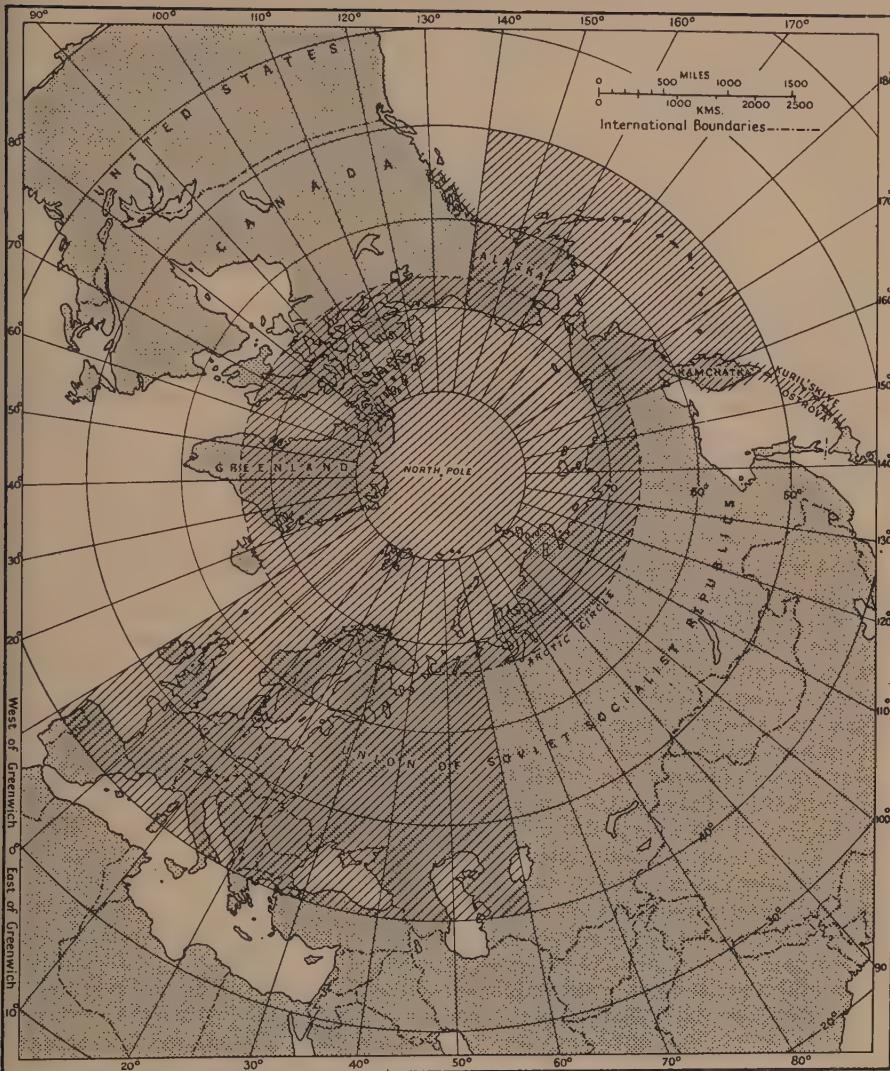
America was building up its defence system because of the aggressive policies of the Soviet Union, the United States representative continued; it would never itself attack another country. American defence measures were matters of public knowledge, whereas what the Soviet Union did was veiled in secrecy. If President Eisenhower's "open sky" proposal of 1955, or an inspection system such as the United States had proposed in the Disarmament Sub-Committee in 1957, were accepted, the fear of war would decrease and defence preparations could be dispensed with. The Soviet Union could contribute to peace by changing its negative attitude towards, for instance, a disarmament plan endorsed by the twelfth session of the General Assembly. Instead, it was engaging in vilifying propaganda against the United States. This did not indicate desire for a successful summit conference or for peace.

Statements opposing the USSR draft resolution were also made by the representatives of Canada, China, Colombia, France, Iraq, Japan, Panama and the United Kingdom, who generally associated themselves with the position of the United States. Several members regretted that the complaint had been brought before the Council without prior consultation among the parties.

Following the general debate on 21 April, the President (the United States representative) proposed to put the USSR draft resolution to a vote. The USSR representative moved, first, to adjourn the meeting until the following afternoon and, then, until the following morning to enable him to study statements made in the Council. Both motions were rejected. The USSR representative then charged that the United States representative had preferred to avoid consideration and free discussion in the Council and to resort to the machinery of voting. He thereupon withdrew his draft resolution in protest against the procedure followed.

The Council reconvened on 29 April 1958, this time at the request of the United States, to continue its consideration of the USSR complaint.

The United States submitted a draft resolution whereby the Council would: (1) recommend the prompt establishment of the northern zone of international inspection against such attack, comprising the area north of the Arctic Circle with certain exceptions and additions, which had been considered by the United Nations Disarmament Sub-Committee in August 1957; and (2) call upon Canada, France, the



Proposed Arctic zones of international inspection, 1957 and 1958, shown in hatching.

USSR, the United Kingdom and the United States, together with Denmark and Norway, and any other States having territory north of the Arctic Circle which would wish to have such territory included in the international inspection zone, to participate in immediate discussions on the technical arrangements required.

Introducing this text, the United States representative said that his Government was proposing negotiations on an international inspection system to remove the fear of surprise attack. The negotiations should not await the renewal of discussion on the general question of disarmament, which also remained urgent. The inspection system should be started in the Arctic Zone as a first line of approach.

Sweden supported the United States draft resolution but proposed that a paragraph be added by which the Council would express the view that the discussions on technical arrangements might serve as a useful basis for the deliberations on the disarmament problem at the summit conference on the convening of which talks were in progress. This amendment was subsequently accepted by the United States with a minor verbal change.

The USSR representative charged that the United States proposal was only a diversionary manoeuvre. The threat to peace came only from the United States which could remove it by ending the dangerous flights. The Council should call upon it to do so. The proposed Arctic inspection would serve only to obtain intelligence data on the USSR. Such vital problems as disarmament could not be solved by votes in bodies where majorities of members were linked to one another by military agreements. Negotiations on the basis of equality were needed, and a summit conference would be most effective.

The USSR submitted a second draft resolution, identical with the previous USSR draft except for an additional final paragraph whereby the Council, mindful of the necessity for taking steps as soon as possible to avert the threat of atomic warfare and ease international tension, would note with satisfaction that preliminary talks were in progress between the interested States on a summit conference to discuss a number of urgent problems, such as measures to preclude the danger of surprise attack, and would express the hope that the summit conference would be held as soon as possible.

Statements opposing the USSR text and supporting that of the United States were made by the representatives of Canada, China, France, Iraq, Japan, Panama and the United Kingdom. Several of them hoped that the USSR would reconsider its stand and make a unanimous decision possible.

The Secretary-General also made a statement recalling that he had previously expressed the opinion that he had not only the right but the duty to intervene when he felt that to do so would support the purposes of the Organization and the principles of the Charter. He had previously welcomed the USSR's decision to suspend unilaterally atomic bomb tests and he wished now to welcome the initiative of the United States on the same basis and in the same spirit. He hoped that Governments would try out the line of trust as a way out of the disintegration and decline under which mankind was suffering.

The Council voted on the draft resolutions before it on 2 May. The United States draft resolution, as amended, received 10 votes in favour and 1 against (USSR) and was not adopted, as the negative vote was that of a permanent member of the Council.

The USSR draft resolution was then rejected by 9 votes to 1 (USSR), with 1 abstention (Sweden).

Documentary references

Security Council, meetings 813-17.

S/3990, S/3991. Letters of 18 April 1958 from representative of USSR.

S/3993. USSR draft resolution.

S/3995. United States draft resolution as amended, rejected by Council on 2 May 1958, meeting 817, because of the negative vote of a permanent member of the Council. The vote was as follows:

In favour: Canada, China, Columbia, France, Iraq, Japan, Panama, Sweden, United Kingdom, United States.

Against: USSR.

S/3997. USSR draft resolution, rejected on 2 May 1958, meeting 817, by 9 votes to 1 (USSR) with 1 abstention (Sweden).

S/3998. Sweden amendment to United States draft resolution, S/3995.

S/4000. Letter of 30 April 1958 from the representative of USSR.

THE ANTARCTIC TREATY, 1959

[In May 1958 the United States Government invited the eleven other governments participating in the International Geophysical Year in the Antarctic to a Conference (see *Polar Record*, Vol. 9, No. 61, p. 353-55). We print below the Final Act of the Conference and the full text of the resulting Antarctic Treaty signed at Washington on 1 December 1959. The source of the text is *Miscellaneous No. 21* (1959). Cmnd. 913, London, H.M. Stationery Office.]

FINAL ACT

The Governments of Argentina, Australia, Belgium, Chile, the French Republic, Japan, New Zealand, Norway, the Union of South Africa, the Union of Soviet Socialist Republics, the United Kingdom of Great Britain and Northern Ireland, and the United States of America.

Having accepted the invitation extended to them on 2 May 1958 by the Government of the United States of America to participate in a Conference on Antarctica to be attended by representatives of the twelve nations which co-operated in the Antarctic Programme of the International Geophysical Year;

Appointed their respective Representatives, who are listed below by countries:

[Here follow the names of the representatives of the above-listed Governments.]

The Conference met at Washington on 15 October 1959. It had before it as a basis for discussion working papers considered in the course of informal preparatory talks among representatives of the twelve countries who had met in Washington following the aforesaid invitation of the Government of the United States of America.

At the opening Plenary Session of the Conference the Honourable Herman Phleger, Head of the United States Delegation, was elected Chairman of the Conference. Mr Henry E. Allen was appointed Secretary-General of the Conference and Rapporteur.

The Conference established two Committees under rotating chairmanship to deal with the items on the agenda of the Conference. Following initial consideration of such items, these Committees were reconstituted as a Committee of the Whole. There were also established a Credentials Committee, a Drafting Committee, and a Committee on Style.

The final session of the Conference was held on 1 December 1959.

As a result of the deliberations of the Conference, as recorded in the summary

records and reports of the respective Committees and of the Plenary Sessions, the Conference formulated and submitted for signature on 1 December 1959, the Antarctic Treaty.

The Conference recommended to the participating Governments that they appoint representatives to meet in Washington within 2 months after the signing of the Treaty and thereafter at such times as may be convenient, pending the entry into force of the Treaty, to consult together and to recommend to their Governments such interim arrangements regarding the matters dealt with in the Treaty as they may seem desirable.

IN WITNESS WHEREOF, the following Plenipotentiaries sign this Final Act.

DONE at Washington this first day of December one thousand nine hundred and fifty-nine, in the English, French, Russian and Spanish languages, each version being equally authentic, in a single original which shall be deposited in the archives of the Government of the United States of America. The Government of the United States of America shall transmit certified copies thereof to all the other Governments represented at the Conference.

[Here follow the signatures on behalf of the Governments of: Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, Union of South Africa, Union of Soviet Socialist Republics, United Kingdom of Great Britain and Northern Ireland, United States of America.]

THE ANTARCTIC TREATY

The Governments of Argentina, Australia, Belgium, Chile, the French Republic, Japan, New Zealand, Norway, the Union of South Africa, the Union of Soviet Socialist Republics, the United Kingdom of Great Britain and Northern Ireland, and the United States of America.

Recognizing that it is in the interest of all mankind that Antarctica shall continue forever to be used exclusively for peaceful purposes and shall not become the scene or object of international discord;

Acknowledging the substantial contributions to scientific knowledge resulting from international co-operation in scientific investigation in Antarctica;

Convinced that the establishment of a firm foundation for the continuation and development of such co-operation on the basis of freedom of scientific investigation in Antarctica as applied during the International Geophysical Year accords with the interests of science and the progress of all mankind;

Convinced also that a treaty ensuring the use of Antarctica for peaceful purposes only and the continuance of international harmony in Antarctica will further the purposes and principles embodied in the Charter of the United Nations;¹

Have agreed as follows:

Article I

1. Antarctica shall be used for peaceful purposes only. There shall be prohibited, *inter alia*, any measures of a military nature, such as the establishment of military

¹ "Treaty Series No. 67 (1946)", Cmd. 7015.

bases and fortifications, the carrying out of military manoeuvre, as well as the testing of any type of weapons.

2. The present Treaty shall not prevent the use of military personnel or equipment for scientific research or for any other peaceful purpose.

Article II

Freedom of scientific investigation in Antarctica and co-operation toward that end, as applied during the International Geophysical Year, shall continue, subject to the provisions of the present Treaty.

Article III

1. In order to promote international co-operation in scientific investigation in Antarctica, as provided for in Article II of the present Treaty, the Contracting Parties agree that, to the greatest extent feasible and practicable:

- (a) information regarding plans for scientific programmes in Antarctica shall be exchanged to permit maximum economy and efficiency of operations;
- (b) scientific personnel shall be exchanged in Antarctica between expeditions and stations;
- (c) scientific observations and results from Antarctica shall be exchanged and made freely available.

2. In implementing this Article, every encouragement shall be given to the establishment of co-operative working relations with those Specialized Agencies of the United Nations and other international organizations having a scientific or technical interest in Antarctica.

Article IV

1. Nothing contained in the present Treaty shall be interpreted as:

- (a) a renunciation by any Contracting Party of previously asserted rights of or claims to territorial sovereignty in Antarctica;
- (b) a renunciation or diminution by any Contracting Party of any basis of claim to territorial sovereignty in Antarctica which it may have whether as a result of its activities or those of its nationals in Antarctica, or otherwise;
- (c) prejudicing the position of any Contracting Party as regards its recognition or non-recognition of any other State's right of or claim or basis of claim to territorial sovereignty in Antarctica.

2. No acts or activities taking place while the present Treaty is in force shall constitute a basis for asserting, supporting or denying a claim to territorial sovereignty in Antarctica or create any rights of sovereignty in Antarctica. No new claim, or enlargement of an existing claim, to territorial sovereignty in Antarctica shall be asserted while the present Treaty is in force.

Article V

1. Any nuclear explosions in Antarctica and the disposal there of radioactive waste material shall be prohibited.

2. In the event of the conclusion of international agreements concerning the use of nuclear energy, including nuclear explosions and the disposal of radioactive waste material, to which all of the Contracting Parties whose representatives are entitled to participate in the meetings provided for under Article IX are parties, the rules established under such agreements shall apply in Antarctica.

Article VI

The provisions of the present Treaty shall apply to the area south of 60° South Latitude, including all ice shelves, but nothing in the present Treaty shall prejudice or in any way affect the rights, or the exercise of the rights, of any State under international law with regard to the high seas within that area.

Article VII

1. In order to promote the objectives and ensure the observance of the provisions of the present Treaty, each Contracting Party whose representatives are entitled to participate in the meetings referred to in Article IX of the Treaty shall have the right to designate observers to carry out any inspection provided for by the present Article. Observers shall be nationals of the Contracting Parties which designate them. The names of observers shall be communicated to every other Contracting Party having the right to designate observers, and like notice shall be given of the termination of their appointment.

2. Each observer designated in accordance with the provisions of paragraph 1 of this Article shall have complete freedom of access at any time to any or all areas of Antarctica.

3. All areas of Antarctica, including all stations, installations and equipment within those areas, and all ships and aircraft at points of discharging or embarking cargoes or personnel in Antarctica, shall be open at all times to inspection by any observers designated in accordance with paragraph 1 of this Article.

4. Aerial observation may be carried out at any time over any or all areas of Antarctica by any of the Contracting Parties having the right to designate observers.

5. Each Contracting Party shall, at the time when the present Treaty enters into force for it, inform the other Contracting Parties, and thereafter shall give them notice in advance, of

- (a) all expeditions to and within Antarctica, on the part of its ships or nationals, and all expeditions to Antarctica organized in or proceeding from its territory;
- (b) all stations in Antarctica occupied by its nationals; and
- (c) any military personnel or equipment intended to be introduced by it into Antarctica subject to the conditions prescribed in paragraph 2 of Article I of the present Treaty.

Article VIII

1. In order to facilitate the exercise of their functions under the present Treaty, and without prejudice to the respective positions of the Contracting Parties relating to jurisdiction over all other persons in Antarctica, observers designated under paragraph 1 of Article VII and scientific personnel exchanged under subparagraph 1 (b) of Article III of the Treaty, and members of the staffs accompanying any such persons, shall be subject only to the jurisdiction of the Contracting Party of which they are nationals in respect of all acts or omissions occurring while they are in Antarctica for the purpose of exercising their functions.

2. Without prejudice to the provisions of paragraph 1 of this Article, and pending the adoption of measures in pursuance of subparagraph 1 (e) of Article IX, the Contracting Parties concerned in any case of dispute with regard to the exercise of jurisdiction in Antarctica shall immediately consult together with a view to reaching a mutually acceptable solution.

Article IX

1. Representatives of the Contracting Parties named in the preamble to the present Treaty shall meet at the City of Canberra within two months after the date of entry

into force of the Treaty, and thereafter at suitable intervals and places, for the purpose of exchanging information, consulting together on matters of common interest pertaining to Antarctica, and formulating and considering, and recommending to their Governments, measures in furtherance of the principles and objectives of the Treaty, including measures regarding:

- (a) use of Antarctica for peaceful purposes only;
- (b) facilitation of scientific research in Antarctica;
- (c) facilitation of international scientific co-operation in Antarctica;
- (d) facilitation of the exercise of the rights of inspection provided for in Article VII of the Treaty;
- (e) questions relating to the exercise of jurisdiction in Antarctica;
- (f) preservation and conservation of living resources in Antarctica.

2. Each Contracting Party which has become a party to the present Treaty by accession under Article XIII shall be entitled to appoint representatives to participate in the meetings referred to in paragraph 1 of the present Article, during such time as that Contracting Party demonstrates its interest in Antarctica by conducting substantial scientific research activity there, such as the establishment of a scientific station or the despatch of a scientific expedition.

3. Reports from the observers referred to in Article VII of the present Treaty shall be transmitted to the representatives of the Contracting Parties participating in the meetings referred to in paragraph 1 of the present Article.

4. The measures referred to in paragraph 1 of this Article shall become effective when approved by all the Contracting Parties whose representatives were entitled to participate in the meetings held to consider those measures.

5. Any or all of the rights established in the present Treaty may be exercised as from the date of entry into force of the Treaty whether or not any measures facilitating the exercise of such rights have been proposed, considered or approved as provided in this Article.

Article X

Each of the Contracting Parties undertakes to exert appropriate efforts, consistent with the Charter of the United Nations, to the end that no one engages in any activity in Antarctica contrary to the principles or purposes of the present Treaty.

Article XI

1. If any dispute arises between two or more of the Contracting Parties concerning the interpretation or application of the present Treaty, those Contracting Parties shall consult among themselves with a view to having the dispute resolved by negotiation, inquiry, mediation, conciliation, arbitration, judicial settlement or other peaceful means of their own choice.

2. Any dispute of this character not so resolved shall, with the consent, in each case, of all parties to the dispute, be referred to the International Court of Justice for settlement; but failure to reach agreement on reference to the International Court shall not absolve parties to the dispute from the responsibility of continuing to seek to resolve it by any of the various peaceful means referred to in paragraph 1 of this Article.

Article XII

1. (a) The present Treaty may be modified or amended at any time by unanimous agreement of the Contracting Parties whose representatives are entitled to participate in the meetings provided for under Article IX. Any such modification or

amendment shall enter into force when the depositary Government has received notice from all such Contracting Parties that they have ratified it.

(b) Such modification or amendment shall thereafter enter into force as to any other Contracting Party when notice of ratification by it has been received by the depositary Government. Any such Contracting Party from which no notice of ratification is received within a period of two years from the date of entry into force of the modification or amendment in accordance with the provisions of subparagraph 1 (a) of this Article shall be deemed to have withdrawn from the present Treaty on the date of the expiration of such period.

2. (a) If after the expiration of thirty years from the date of entry into force of the present Treaty, any of the Contracting Parties whose representatives are entitled to participate in the meetings provided for under Article IX so requests by a communication addressed to the depositary Government, a Conference of all the Contracting Parties shall be held as soon as practicable to review the operation of the Treaty.

(b) Any modification or amendment to the present Treaty which is approved at such a Conference by a majority of the Contracting Parties there represented, including a majority of those whose representatives are entitled to participate in the meetings provided for under Article IX, shall be communicated by the depositary Government to all the Contracting Parties immediately after the termination of the Conference and shall enter into force in accordance with the provisions of paragraph 1 of the present Article.

(c) If any such modification or amendment has not entered into force in accordance with the provisions of subparagraph 1 (a) of this Article within a period of two years after the date of its communication to all the Contracting Parties, any Contracting Party may at any time after the expiration of that period give notice to the depositary Government of its withdrawal from the present Treaty; and such withdrawal shall take effect two years after the receipt of the notice by the depositary Government.

Article XIII

1. The present Treaty shall be subject to ratification by the signatory States. It shall be open for accession by any State which is a Member of the United Nations, or by any other State which may be invited to accede to the Treaty with the consent of all the Contracting Parties whose representatives are entitled to participate in the meetings provided for under Article IX of the Treaty.

2. Ratification of or accession to the present Treaty shall be effected by each State in accordance with its constitutional processes.

3. Instruments of ratification and instruments of accession shall be deposited with the Government of the United States of America, hereby designated as the depositary Government.

4. The depositary Government shall inform all signatory and acceding States of the date of each deposit of an instrument of ratification or accession, and the date of entry into force of the Treaty and of any modification or amendment thereto.

5. Upon the deposit of instruments of ratification by all the signatory States, the present Treaty shall enter into force for those States and for States which have deposited instruments of accession. Thereafter the Treaty shall enter into force for any acceding State upon the deposit of its instrument of accession.

6. The present Treaty shall be registered by the depositary Government pursuant to Article 102 of the Charter of the United Nations.

Article XIV

The present Treaty, done in the English, French, Russian, and Spanish languages, each version being equally authentic, shall be deposited in the archives of the Government of the United States of America, which shall transmit duly certified copies thereof to the Governments of the signatory and acceding States.

IN WITNESS WHEREOF, the undersigned Plenipotentiaries, duly authorized, have signed the present Treaty.

DONE at Washington this first day of December one thousand nine hundred and fifty-nine.

[Here follow the signatures on behalf of the Governments of: Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, Union of South Africa, Union of Soviet Socialist Republics, United Kingdom of Great Britain and Northern Ireland, United States of America.]

**TERRITORIES CLAIMED BY SOVEREIGN STATES IN
THE ANTARCTIC**

*Antártida Argentina*¹ (Argentina), formally defined by Decree of 2 September 1946.

*Antártica Chilena*² (Chile), formally defined by Presidential Decree of 6 November 1940.

*Australian Antarctic Territory*³ (Australia), established by Order in Council of 7 February 1933, which came into force with a Proclamation on 24 August 1936, after passage of Australian Antarctic Acceptance Act, 13 June 1933.

*Dronning Maud Land*⁴ (Norway), formally constituted by Royal Decree of 14 January 1939.

*Falkland Islands Dependencies*⁵ (United Kingdom), formally defined and consolidated into single administrative unit by Letters Patent of 21 July 1908, and 28 March 1917.

*Ross Dependency*⁶ (New Zealand), established by Order in Council of 30 July 1923.

*Terre Adélie*⁷ (France), annexed by Decrees of 27 March, 2 April and 21 November 1924, and formally defined by Decree of 1 April 1938.

[No formal claims have been made in the sector of Antarctica between longs. 90° W. and 150° W.]

¹ All islands and lands between longs. 25° W. and 74° W. south of lat. 60° S., and South Georgia and South Sandwich Islands (based on claims dating from 1925).

² All lands, islands, etc., between longs. 53° W. and 90° W.; northern limit not defined.

³ All islands and territories, other than Terre Adélie, south of lat. 60° S. between longs. 45° E. and 160° E. (based on claims dating from about 1909).

⁴ That portion of the Antarctic continent between longs. 20° W. and 45° W. (based on claims dating from 1927).

⁵ All islands and territories between longs. 20° W. and 50° W. south of lat. 50° S., and between longs. 50° W. and 80° W. south of lat. 58° S. (based on claims dating from, at latest, 1775–1848).

⁶ All islands and territories south of lat. 60° S. between longs. 160° E. and 150° W. (based on claims dating from 1838–43).

⁷ All islands and territories south of lat. 60° S. between longs. 136° E. and 142° W. (based on claims dating from 1840).

Islands in the Southern Ocean lying outside the claims listed above:
Bouvetøya (Norway), sovereignty proclaimed by Royal Decree of 23 January 1928.

Heard Island and *McDonald Islands* (Australia), annexed by United Kingdom in 1908; sovereignty transferred to His Majesty's Government in the Commonwealth of Australia on 26 December 1947.

Iles Crozet and *Iles de Kerguelen* (France), annexed by Government Decrees in 1924, which consolidated claims to sovereignty exercised since 1772.

Macquarie Island (Australia), included within jurisdiction of the British colony of "Van Diemen's Land" (now Tasmania) in 1825.

Peter I Øy (Norway), sovereignty proclaimed by Royal Proclamation on 1 May 1931.

Prince Edward Islands (South Africa), annexed by United Kingdom in 1908; sovereignty transferred to His Majesty's Government in the Union of South Africa on 24 December 1947 (Marion Island) and 4 January 1948 (Prince Edward Island).

SOVIET CHARTS AND MAPS OF THE ANTARCTIC

Since the start of the current series of Soviet Antarctic expeditions in 1955, considerable attention has been paid to mapping by the successive parties. While few of the maps of land areas known to have been produced are available outside the USSR, a set of fifteen charts of the Southern Ocean are now available at the Scott Polar Research Institute through the kind co-operation of Vice-Admiral V. A. Chekurov, the Hydrographer of the Soviet Navy. These consist of an outline chart of the coast of Antarctica (1:17,000,000), four charts of the south Pacific and south Indian Ocean sectors (1:2,500,000), nine more detailed charts of coastal waters between long. 41° and 114° E. (1:500,000), and one chart of "Mirnyy" roads (1:10,000). These charts are dated 1958 and 1959, and almost all are second or later editions. The standard of production is high.

The Soviet authorities have made easier the problem of Antarctic place-names by publishing a list¹ of some 870 place-names between longs. 45° and 166° E. and lats. 60° and 71° S. This is compiled by the Soviet Antarctic expedition with the aid of the transcription department of the Central Cartographic Agency of the Soviet Navy [Tsentral'noye Kartograficheskoye Proizvodstvo Voyenno-Morskogo Flota]. The list includes the already existing names, taken mainly from *Gazetteer No. 14. Geographic names of Antarctica* (Washington, U.S. Board on Geographic Names, 1956), and also the names given by the Soviet parties. The names are printed in both cyrillic and roman script, and against each are shown its co-ordinates and notes on its origin. The co-ordinates are taken where possible from the Soviet charts mentioned above, and thus the co-ordinates given in the *Gazetteer* have in some cases been revised. About a quarter of the names listed are new Russian ones. Considerable care has clearly been taken to avoid giving a Russian name to an

¹ M. M. Somov, ed. *Perechen' geograficheskikh nazvaniy vostochnoy Antarktidiy* [List of geographical names of eastern Antarctica]. Leningrad, Izdatel'stvo "Morskoy Transport" ["Morskoy Transport" Publishing House], 1959, 84 p.

already named feature. The Russian names are of three types: descriptive (Bukhta Shirokaya = Broad Bay), associated with the expedition (Poluostrov Aviatorov = Aviators' Peninsula), and commemorative of Russian polar explorers and scientists (Ostrov Babushkina = Babushkin Island). Four features named in the United States *Gazetteer* have been found not to exist in the positions recorded and have been omitted.

**ICE THICKNESS AND BOTTOM TOPOGRAPHY OF THE
FILCHNER ICE SHELF AND ALONG THE TRAVERSE
ROUTE BETWEEN "ELLSWORTH" AND "BYRD"
STATIONS, ANTARCTICA**

[Summarized from *Transactions, American Geophysical Union*, Vol. 40, No. 4, 1959, p. 423-26.]

The United States IGY traverses from "Ellsworth" station, during the southern summers of 1957-58 and 1958-59, added considerably to knowledge of the extent and thickness of the Filchner Ice Shelf, also to that of the configuration of the underlying bedrock surface. The second traverse was carried through to "Byrd" station, a distance of 1250 miles (2010 km.), thus providing information on ice thickness and sub-ice topography between the ice front and that station.

The area of the ice shelf was shown to be greater than had been thought, with distances of about 300 miles from the inland margin to the ice front in many places. An area of about 160,000 sq. miles (421,000 sq. km.) is now estimated, a figure comparable to the 210,000 sq. miles (552,600 sq. km.) of the Ross Ice Shelf (Fig. 1).

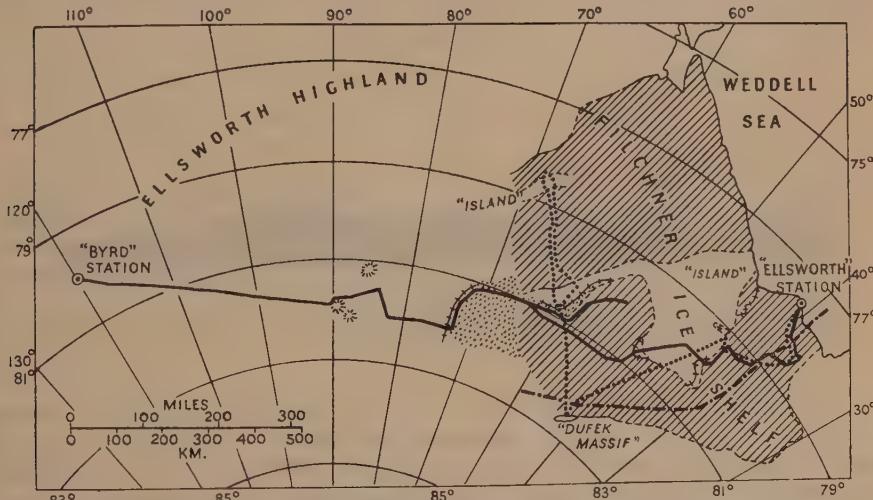


Fig. 1. Filchner Ice Shelf. United States IGY traverse routes and resulting discoveries.

- //\ Ice shelf as known 1957-58. ■■■■■ Ice shelf discovered 1958-59.
- Inland margin of ice shelf as known 1957-58.
- +++++ Inland margin of ice shelf discovered 1958-59.
- Traverse 1957-58. — Traverse 1958-59.
- Axis of trough underneath ice shelf.

Seismic observations disclosed the existence of two "islands", one of considerable area, on which the ice shelf is grounded (Fig. 2). Though these "islands" were below sea level almost everywhere they were crossed, they were higher than the surrounding ice shelf.



Fig. 2. Profiles across Filchner Ice Shelf along 1957-58 traverse route from "Ellsworth" station.

A third feature discovered was a deep trough under the ice shelf, 3500 ft. (1070 m.) below sea level, and between the larger "island", and the land to the south-east (Fig. 1).

In the region beyond the inland margin of the Filchner Ice Shelf the bedrock surface was found to rise from about 4000 ft. (1220 m.) below sea level, near the ice front, to about 4000 ft. above sea level in a mountainous region in the vicinity of lat. 82° S., long. 88° W. (Fig. 3). This mountain area extends for at least 70 miles in an east-west direction. The highest peak surveyed measured 7640 ft. (2330 m.) and the ice surface elevation around the peaks varied between 4500 ft. (1370 m.) and 7000 ft. (2130 m.) above sea level. These mountains were composed of dark gneiss in sharp contact with a light brown biotite granite.

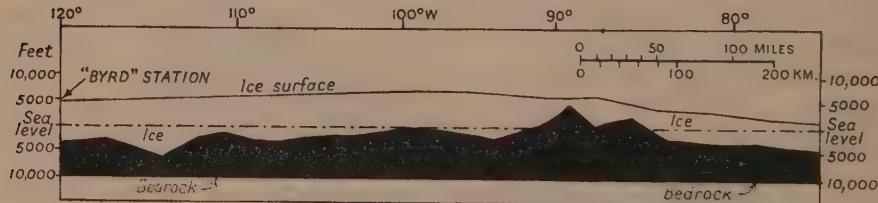


Fig. 3. Profile from inland margin of Filchner Ice Shelf to "Byrd" station along 1958-59 traverse route.

The bedrock surface of the region between this area and "Byrd" station was below sea level at almost all points; the greatest ice thickness measured, 6300 ft. (1920 m.) below sea level, was in lat. 80° 35' S., long. 114° 57' W., about 70 miles east of "Byrd" station. At the same place the greatest ice thickness, 12,000 ft. (3660 m.), was also measured. The topography of the sub-ice surface of this part of the traverse was generally irregular.

ARGENTINE ORGANIZATION FOR ANTARCTIC ACTIVITIES

[Summarized from information supplied by Rear-Admiral R. N. M. Panzarini.]

Argentine organizations concerned with Antarctic affairs are of three types: civil, naval and army.

Civil

(a) *Comisión Nacional del Antártico*, an administrative division of the Ministry of Foreign Affairs. Its functions are to advise government on general policy and to prepare instructions for the implementation of agreed policy. Membership includes the departments of Foreign Affairs, War, Navy, Aero-nautics, Interior, Education and Justice, Agriculture and Livestock, Commerce and Industry and Communications, also the following organizations: Staff of the Armed Forces, Instituto Antártico Argentino, Instituto Geográfico Militar, Servicio de Hidrografía Naval and the Servicio Meteorológico Nacional.

(b) *División Antártida y Malvinas*, within the Directorate of Territorial Sovereignty of the Ministry of Foreign Affairs. It is concerned with matters relating to the "Argentine Antarctic Sector" and also forms the Secretariat of the Comisión Nacional del Antártico.

(c) *Gobernación de la Terra del Fuego, Antártido e Islas del Atlántico Sur*, is charged with the administration of the Antarctic territories.

(d) *Instituto Antártico Argentino*, an autonomous, scientific and technical organization under the Ministerio de Marina, but not a component part of the Navy. Its object is the study of the nature of the Antarctic;¹ to this end it sends scientists to the various Argentine Antarctic stations, and is equipped for the study and documentation of the results of field work. It is in full control of "Ellsworth" station under the United States Argentine agreement of 15 July 1958.

Naval

Servicio de Hidrografía Naval is in overall charge of the administration and of the scientific activities by various Naval departments at the permanent scientific stations "Orcadas", "Melchoir", "Decepción", "Almirante Brown" and "Teniente Cámara"; also of the eighteen refuge huts or satellite stations. These naval departments are: Grupo Naval Antártico (logistics and survey), Servicio de Meteorología Marítima (meteorology), División Antártida (administration), and Dirección de Electrónica Naval (ionospheric research).

Army

Sección Antártida, a section of the General Staff concerned with the administration and operation of the Army stations "General San Martín", "Esperanza" and "General Belgrano", and refuge huts. The Instituto Geográfico Militar plans and carries out geodetic, cartographic and geophysical work at these stations.

¹ *Polar Record*, Vol. 8, No. 56, 1957, p. 419-20.

Other organizations

Several other organizations, such as the meteorological service, universities, museums and the La Plata observatory are concerned with particular aspects of scientific work in the Antarctic.

INTERNATIONAL GEOPHYSICAL COMMITTEE (CIG)

At the Fifth General Assembly of the Special Committee for the IGY (CSAGI), 1958, a proposal was adopted that the observational and data-collecting activities of the IGY should be prolonged for a year in such fields as were determined by the participating nations, and under the name "International Geophysical Co-operation 1959 (IGC, 1959)".¹ This period came to an end on 31 July 1959.

At the eleventh meeting of the Executive Board of the International Council of Scientific Unions (ICSU), 30 September to 3 October 1959, authority was delegated to the International Union of Geodesy and Geophysics (IUGG) to administer a committee, on behalf of ICSU, to be known as the "International Geophysical Committee—Comité International et Géophysique" (CIG). The objects and composition of this committee were set out in the CIG rules adopted at the first meeting held at The Hague, 4–6 November 1959.

The objects of the Committee were as follows: "First, to ensure fullest possible exploitation of the IGY and IGC 1959 data including (a) maintaining the efficient functioning of World Data Centres (WDC), (b) encouraging the discussion and utilization of IGY and IGC 1959 results, and (c) publishing these results, and bibliographies. Secondly, to develop and co-ordinate international plans for the furtherance of co-operation in geophysics and related sciences, especially those of an interdisciplinary nature, including the assembly and comparison of national programmes, the development of international data exchange arrangements and the continued utilization of WDC's, and to encourage appropriate discussion and publication of the results of such programmes."

The composition of CIG is: (a) A Bureau consisting of one representative of each of the following participating Unions: International Union of Geodesy and Geophysics, International Astronomical Union, International Union of Scientific Radio and the International Union of Pure and Applied Physics (subject to the approval of its Executive Committee). A Secretary appointed by the Executive Committee of IUGG.

(b) Members representing the disciplines of meteorology, nuclear radiation, aeronomy, geomagnetism, aurora and airglow, solar activity, ionosphere, cosmic rays, oceanography, glaciology, seismology and palaeogeophysics. Care is to be taken to ensure adequate regional representation, taking into account the scope of the work of the various participants; candidates will be nominated by the participating Unions and the appointments made by the President of ICSU and of these Unions.

¹ *Polar Record*, Vol. 9, No. 61, 1959, p. 345.

(c) Members representing, and nominated by, the following international organizations; (1) WDC's A and B, (2) WMO. Other government, or non-government, organizations having a formal working agreement with ICSU or one of the participating Unions may be invited to nominate a member.

The officers of the Bureau are:

Professor V. V. Belousov, President
 Sir Edward Appleton, (1) Vice-President
 Dr J. Winckler, (2) Vice-President
 Professor M. Minnaert, (3) Vice-President
 Ing. Gen. G. Laclavère, Secretary-General

RECENT NEW POLAR PERIODICALS

Each year sees the appearance of new periodical literature relating wholly or in part to the polar regions. To keep readers abreast of this, a briefly annotated list of all newly published periodical literature of polar interest will appear from time to time in the *Polar Record*. A list of all current periodicals held by the Scott Polar Research Institute may be obtained *gratis* on application to the Librarian. The following list is retrospective to 1955:

Activad Antártica Argentina, Departamento Soberanía Territorial Division. Ano 1, No. 1, July 1959. Irregular. News bulletin of Argentine Antarctic activities.

Annual Report of the Ross Dependency Research Committee, Department of Scientific and Industrial Research, Wellington, New Zealand. First annual report, 31 March 1959. Annual. Committee co-ordinates and supervises New Zealand activities in the Ross Dependency.

Antarctic, New Zealand Antarctic Society, 1 Ariki Road, Wellington, E. 2, New Zealand. Vol. 1, No. 1, 1956. Quarterly. News bulletin providing international coverage of Antarctic activities.

Antarctic Record, Reports of the Japanese Antarctic Research Expedition, Ministry of Education, Tokyo. No. 1, December 1957. Irregular. Results of 1956-57, 1957-58 expeditions.

Bulletin of the United States Antarctic Projects Office, United States Antarctic Projects Office, Washington, D.C. Vol. 1, No. 1, September 1959. Irregular. Covers activities of USAPO and other relevant matters.

Ice. News Bulletin of the British Glaciological Society, British Glaciological Society, Scott Polar Research Institute, Cambridge, England. No. 1, January 1958. Twice a year. Information about current events of glaciological interest.

I.G.Y. Bulletin, National Academy of Sciences, Washington, D.C. No. 1, July 1957. Monthly. Brief articles and reports of United States projects and experiments during and after IGY. Scientific news of activities in other countries. Reprinted from *Transactions American Geophysical Union*.

Informatsionnyy Byulleten' Instituta Geologii Arktiki, Institute of the Geology of the Arctic, Ministry of Geology and Conservation of Resources of the USSR, Leningrad. Vyp. 13, 1959. Irregular. Contains short reports on current research problems of the Institute.

Informatsionnyy Byulleten' Sovetskoy Antarkticheskoy Expeditii, Arctic and Antarctic Research Institute, Leningrad. No. 1, 1958. Irregular. Short papers on preliminary results of Soviet Antarctic research.

Materialy k Osnovam o Merzlykh Zonakh Zemnoy Kory [Materials on the principles of study of the frozen zones of the earth's crust], Obruchev Institute of Permafrost Studies, Moscow. Vyp. 1, 1955. Irregular. Short papers on all aspects of permafrost studies.

Polar Notes, Stefansson Collection, Dartmouth College Library, Hanover, New Hampshire. No. 1, November 1959. Irregular. Articles relating to all aspects of Arctic knowledge.

Problemy Arktiki, Arctic and Antarctic Research Institute, Leningrad. Vyp. 1, 1957. Irregular. Revived in 1957 after lapse of several years. Contains results of research by Institute staff, mainly in geophysical fields.

Problemy Arktiki i Antarktiki, Arctic and Antarctic Research Institute, Leningrad. Vyp. 1, 1959. Irregular. Apparently replaces *Problemy Arktiki*, having the same format and type of contents.

Problemy Severa [Problems of the North], Academy of Sciences of the USSR. Commission for Problems of the North of the Council for the study of Productive Forces, Moscow. Vyp. 1, 1958. Irregular. Results of research in all fields, including economics.

Sbornik Statey po Paleontologii i Biostratigrafi [Collected Articles on Palaeontology and Biostratigraphy], Institute of the Geology of the Arctic, Ministry of Geology and Conservation of Resources of the USSR, Leningrad. Vyp. 12, 1958. Irregular. Photographically reproduced typescript, but with very clear illustrations.

Soviet Bloc International Geophysical Year Information, United States Dept. of Commerce, Office of Technical Services, Washington, D.C., 14 February 1958. Weekly. Translated extracts from Soviet bloc press reports relating to IGY and IGC activities.

Terres Australes et Antarctiques Françaises, La Documentation Française, 14-16 rue Lord-Byron, Paris (8e). No. 1, October 1957. Irregular. Information on French Antarctic territories. Brief scientific articles, news, official Decrees, etc.

THE POLECAT 940 TRACKED VEHICLE

[Summarized from information provided by the United States Army Polar Research and Development Center, Fort Belvoir, Virginia, U.S.A.]

The Polecat 940, an articulated tracked vehicle, is a development of the Weasel and was designed by the Ambulitter Corporation, Chesterton, Ma., U.S.A. It was used with success by the United States Army Polar Research and Development Center during the summer of 1959 on the Greenland ice sheet where it was proved to combine extreme manœuvrability with dependable performance in rough terrain and polar conditions.

The main cab is made of aluminium with 2 in. styrofoam insulation and has seating for a driver and a radio operator, and cargo room. The rear cab, similarly constructed, has six easily removable seats and a door wide enough to admit a military stretcher. Dimensions of the main cab are: 11 ft. 4 in. long 5 ft. 4 in. wide and 6 ft. 9 in. high; the rear cab is 13 ft. 7 in. long and the same width and height. The ground clearance is 14 in.

The vehicle is powered with a 260 cu. in. overhead valve, six cylinder Inter-



(Facing p. 170)

“Polecat 940” tracked vehicle
Photograph by U.S. Army Polar Research and Development Center



national Harvester engine, with a five-speed gear box and a lockable differential. The engine compartment opens into the cab for ease of maintenance and access in case of fire. The fuel tanks carry 70 (United States) gallons and the average consumption is 8 miles per gallon.

WELDING OF STRUCTURAL STEELS AT LOW TEMPERATURES

[By H. Winterton, Physical Metallurgy Division, Department of Mines and Technical Surveys, Canada.]

Operator discomfort can lead to poor welding in winter conditions, with the problem increasing as the temperature falls. Wind velocity is also important unless temporary shields or an enclosure are used.

Apart from this, it may be expected for technical reasons that there will be a decline in welding quality arising from the increased cooling rates to which the weld and the adjacent heat-affected zones are subjected. These reasons are as follows:

- (1) Fissuring and low ductility in the weld metal, to an extent depending on the quality, and hydrogen content, of the deposited weld metal.
- (2) High hardness in the heat-affected zone, perhaps associated with poor notch-ductility.
- (3) Heat-affected zone (or underbead) cracking.

There is a general tendency for the incidence of these defects to increase as the ambient temperature declines. The prime effect of temperature for each of these defects has still to be established, but there are indications that in some cases the effect of rate of cooling may reverse over particular temperature ranges.

Both American and Canadian codes are used in structural steel construction in Canada, and this may often result in no welding being done if the ambient temperature falls below 0° F. (-17° C.). One Canadian Code (W59) prescribes that if the ambient temperature is between 0° F. and 32° F. (0° C.) the work must be heated to "hand-warm" before welding is undertaken.

Investigations into the problem were made in a series of field tests at Churchill by the Physical Metallurgy Division of the Canadian Department of Mines and Technical Surveys during 1948-49, and in a cold room during 1954-55. Further investigations are about to be carried out.

SCAR BULLETIN

No. 5, May 1960

Antarctic Symposium at Buenos Aires, 17-25 November 1959

At the CSAGI Antarctic Conference held in Paris in 1957 the Argentine delegation proposed that a symposium should be held in Buenos Aires soon after the completion of the IGY to enable results obtained during that period to be described and discussed. At the generous invitation of the Argentine Government the symposium was held between 17 and 25 November 1959 in Buenos Aires.

The symposium was attended by fifty-five scientists, including official delegates from Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, Union of South Africa, United Kingdom, United States and USSR, also from CSAGI, ICSU, IUGG, SCAR and WMO. Office-bearers and chairmen of the scientific sessions were elected at the first plenary session. Office-bearers were: President, Rear-Admiral R. N. M. Panzarini; Vice-presidents, M. M. Somov and J. Tonnesen; Secretaries, T. Hatherton and W. L. Hofmeyer. Twenty-six working sessions were held during which 188 papers were read. At the final plenary session on 25 November chairmen of the scientific sessions presented their reports, which may be summarized as follows.

Exploration and Geography. Chairmen: G. de Gerlache and P. G. Law.

Twelve papers were presented at three sessions. It was generally agreed that large areas of the continent had now been photographed from the air and that maps are now available showing most of the major features. More work is required along the coast of Oates Land and ships have still to penetrate to the coast of the Bellingshausen Sea. Large-scale maps are also needed giving more detail of rock outcrops and completing the contour of the ice sheet. Considerable ambiguity also exists concerning the limits of ice attached to the land along certain sections of the coast.

New maps of coastal areas were presented by Australia, Belgium, Japan and the USSR. A French paper made valuable proposals concerning symbols for representing ice features on maps, and a Russian paper described a new technique for accurate determination of altitude in inland areas of the ice sheet.

Results of gravity observations and seismological soundings were presented from a number of areas on the continent.

Meteorology. Chairmen: W. J. Gibbs, K. Langlo, H. Wexler.

Thirty-five papers were presented at five sessions. These dealt with instruments and methods of observation, surface effects including optical phenomena, katabatic winds and radiation exchanges at the snow surface, statistical studies, synoptic and air-mass problems, questions of general circulation including discussions of cross-sections of mean temperature and wind, strato-

spheric circulations and stratospheric warming, heat budget of the atmosphere, ozone content, and a report on the International Antarctic Analysis Centre at Melbourne.

Papers emphasized the importance of the meteorological programme of SCAR and, in particular, the desirability of obtaining surface and upper air observations from the region between lats. 40° and 65° S., the necessity for observations of katabatic wind and refraction phenomena; also of total ozone, surface ozone, and profile of ozone content from as many stations as possible.

Upper atmospheric physics. Chairmen: S. Chapman and J. Delannoy.

There were three sessions of this group. Nine papers concerned with auroral and spectrographic observations were presented. One by F. Bond and F. Jacka, and another by O. Schneider, gave statistical studies of auroral locations, suggesting a modified location for the Southern Auroral Zone.

A paper by R. W. Knecht discussed ionospheric variations at the South Pole, showing interesting diurnal variations despite the constancy of solar zenith angle.

M. M. Somov gave a survey of Russian work on magnetism, ionosphere, cosmic rays and aurora.

The incidence of polar blackout and storm types of Es in the two hemispheres was discussed by W. R. Piggott, and observations were found to be reasonably consistent when compared at corresponding geomagnetic locations. He also ascribed the "F" layer changes at Halley Bay to horizontal movements in the region.

Some observations of the twilight Lithium line were reported by J. Delannoy and N. J. Oliver. Absolute measurements carried out at "Dumont d'Urville" on the N_2+ ion content in the atmosphere above 200 km. were presented by G. Weill. The mean ratio of N_2+ ions to N_2 molecules was found to lie around 2.5×10^{-6} and a strong latitude dependence was shown. A paper by A. Mrkos reported several aspects of the photo-electric measurements taken at "Mirnyy" and elsewhere. This showed the influence of both twilight and auroral phenomena similar to those discussed by Weill. The influence of changes in meteor activity on the intensity of the sodium D lines 589 Å were also described.

Results of wind measurements at Mawson from the movement of meteor trails in the 75 to 110 km. region were described in a paper by W. Elford. Considerable gradients of wind velocity with height were evident. Steady, diurnal and semi-diurnal components, were derived.

Geomagnetism. Chairman: T. Nagata.

Fourteen papers were read at two sessions. Seven papers dealt with geomagnetic variations, especially geomagnetic disturbances in relation to other upper atmospheric and cosmic phenomena. One of these, from the United States, described in some detail aspects of geomagnetic polar disturbances in both the Northern and Southern Auroral Zones.

The other papers were concerned with slow variations in the geomagnetic field in relation to the earth's crust and the earth's interior. Data on secular variations were given in Argentine, French and Japanese papers: it was agreed that the intensity of geomagnetic secular variations over and around

Antarctica is considerably greater than that over the Northern Hemisphere. Three British papers discussed rock-samples from the Graham Land area covering the geological period from the Jurassic to the present. A Japanese paper described Pre-Cambrian or Cambrian gneiss from Dronning Maud Land. Data showed some evidence of a drift of the Antarctic continent from lower latitude towards the geographic South Pole.

Cosmic rays. Chairman: H. V. Neher.

Nine papers were presented at two sessions. One paper (A. Fenton and J. Jacklin) described a technique for measuring the behaviour of lower energy primaries using a cosmic ray telescope in such a way that particles which could penetrate 10 cm. of lead were measured, but not those which penetrated 20 cm. The authors reported an interesting increase in meson intensity recorded at Hobart (geomagnetic lat. 55° S.) but not at Mawson (geomagnetic lat. 73° S.). The results of a study of Forbush-type decreases concerned with the change of east-west effect during magnetic storms revealed a hardening of the primaries or a preferential removal of low-energy particles.

Another paper (K. G. McCracken) dealt with the site of the modulation mechanism that causes the diurnal effect and concluded that the modulating mechanism lies outside the influence of the earth or its magnetic field.

Results of neutron and meson measurements during a voyage from Japan across the Indian Ocean to Cape Town and on to the Antarctic were reported (T. Kitamura, M. Kodama, Y. Miyazaki and T. Nagata). These showed that the cosmic ray equator in the neighbourhood of long. 110° E. is about 5° south of the geomagnetic equator, and demonstrated the sharpness and position of the "knee" of the latitude curve which occurred at geomagnetic latitude 37° to 38° S.

A paper was presented on the latitude effect of cosmic rays at high altitudes from geomagnetic lat. 87° N. to 80° S. (H. R. Anderson and H. V. Neher). Other observations were described on quasi-periodic variations and the effects of solar flares and geomagnetic storms on neutron monitors.

Oceanography. Chairman: G. Laclavère.

Eighteen papers were read at two sessions. These were concerned with investigations of the chemistry and biology of the Weddell Sea and the sub-Antarctic Southern Ocean. A report was given (M. Ewing) on the recent observations made from the *Vema* in the Scotia Arc region. Photographs of the ocean floor in this area revealed unexplained features.

Glaciology. Chairmen: G. de Q. Robin, P.-E. Victor.

Thirty papers were read at four sessions. These covered a wide range from the characteristics of falling snow and its transformation into glacier ice to the state of the bottom layers of the Antarctic ice sheet as deduced from seismic soundings.

It appears that the annual net accumulation over the continent has varied during the past few years from a water equivalent of about 7 cm. a year at the South Pole to almost 50 cm. a year at "Norway" station. Other reports indicate a small retreat of ice in recent decades in the coastal regions near the Belgian, Japanese, and Russian IGY stations.

Thicknesses of floating ice up to 1000 m. have been recorded, but 300 to 400 m. appear to be the average. Bottom-melting of the ice shelf in the vicinity of "NAF McMurdo" has been shown to have been considerable.

The section of Antarctica on the Atlantic and Indian Ocean side of a line joining the Ross Ice Shelf and the Filchner Ice Shelf is certainly a continental block to which Graham Land appears to be structurally linked along a line through the Sentinel and Horlick Mountains. To the west of these mountains there is a trough, up to 2500 m. below sea level, running from the southern part of the Ross Ice Shelf towards the Bellingshausen Sea. The coastal structure in the region of this trough has been shown to be that of an island region, and not continental.

Geology and Geochemistry. Chairmen: R. J. Adie and H. Camacho.

Nineteen papers were read at two sessions; ten of these dealing with "East Antarctica".

Although most of the papers were unrelated to each other, it is clear that the general trend in Antarctic geology is directed along the following definite lines: the establishment of stratigraphic successions in different areas and subsequent correlation, the dating of Basement Complex rocks by K-A and Sr-Rb methods, the subdivision of the Basement Complex, detailed petrographic description of igneous and metamorphic rocks, the relationship between geomorphology and tectonics, submarine topography studies, and crustal structure deduced from geophysical studies.

Geophysical work shows that Antarctica is divided into two areas: the main continental shield and Graham Land, and an "island area" in Marie Byrd Land. These are thought to be separated from each other by a deep trough. The geological aspects are more complicated, because they indicate that there are major stratigraphical breaks in the geological succession in these areas. From a stratigraphical point of view the most interesting part of the continent for future work is the region between the Filchner Ice Shelf and the Ross Ice Shelf.

Biology and Physiology. Chairman: H. A. Orlando.

Eighteen papers were presented at three sessions. Under biology there was one paper on botany and a number on vertebrate and invertebrate zoology. There were also a number of papers on various aspects of human physiology and psychology at Antarctic stations (P. G. Law, M. A. Cabeza Quiroga, A. Gesino and A. Antinnucci).

Resolutions

At the end of the sessions on meteorology, upper atmosphere physics, geomagnetism, cosmic rays and biology, a number of resolutions were formed and submitted to the final plenary session where they were adopted (see Appendix).

In addition it was suggested that the greetings of the Symposium should be sent to all Antarctic stations.

A vote of thanks was extended to the Argentine Government and to Vice-Admiral Panzarini for making the Symposium possible.

Conclusions

An abstract of the papers presented at the Symposium will be published in the series of monographs of the IUGG. The full texts of the papers are to be published by the Instituto Antártico Argentino towards the end of 1960.

Appendix

Resolutions adopted at the closing plenary session

Meteorology

(1) The Symposium urges interested countries, the World Meteorological Organization (WMO) and the Special Committee on Antarctic Research (SCAR) to continue their efforts to make the International Antarctic Analysis Centre (IAAC) as effective as possible, in particular by improving the telecommunication arrangements necessary for a proper functioning of the Centre, and by facilitating the assignment of qualified foreign meteorologists.

(2) The meeting considers that the WMO should study the advisability of revising the present method of reporting wind directions at the South Pole.

(3) The meeting notes that some stations in the Antarctic are reporting monthly vector wind directions in the monthly CLIMAT reports and recommends that the WMO should study the advisability of introducing this practice for all stations transmitting CLIMAT reports.

(4) The meeting notes the value of making observations of optical phenomena such as halos, etc., during Antarctic traverses, and considers that expedition leaders should be encouraged to arrange for such observations to be made as a matter of routine. In this connexion the paper by F. R. Blake, entitled "Observations on unusual low altitude solar halos in Antarctica" (No. 14), is considered to be useful.

(5) Considering the appreciable errors which may occur in the values of wind speed measurements by radio-electric means at low angles and at high wind velocities (of the order of 100 knots), the meeting urges that the resolution adopted by the WMO on this subject be more generally adhered to.

(6) The meeting considers it highly desirable that measurements of atmospheric ozone in the Antarctic be continued and intensified. Observations should be made both at coastal and inland stations and should preferably include the measurement of total amount, vertical distribution and surface ozone.

Aurorae

(1) The meeting has analysed the convenience of continuing auroral research in the Antarctic by the different observing and recording techniques. It has confirmed the findings of earlier similar studies that visual auroral observations are a necessary part of every auroral research programme, even if several types of automatic recording instruments (such as all-sky cameras) are run simultaneously, since the present state of such automatic techniques does not give a full coverage of all features involved. It is therefore strongly recommended that visual observations should form a part of every programme of Antarctic research groups.

(2) The meeting, recognizing the need for a uniform international nomenclature and classification of aurorae and for adequate description of auroral forms, colours, and intensities, suggests that SCAR should recommend to the Auroral Committee of the International Association of Geomagnetism and Aeronomy (IAGA) that such an international classification be worked out in the near future, with a view to publishing a new *Atlas of auroral forms* to replace the edition of 1951 which is now out of print.



Japanese "Syowa" station, Angul Island, Prins Harald Kyst. Continental land in background.
Aurora camera on building in right foreground.



Such a classification should cover all characteristic auroral forms seen inside, within and outside the auroral zone.

Geomagnetism

(1) In view of the important geographical situation of South Georgia and Bouvetøya for the investigation of secular change in geomagnetism, particularly because of the presence of a secular change focus in their vicinity, the meeting recommends that magnetic repeat-stations be established on those islands. An analogous recommendation is advanced with regard to other such foci existing in high southern latitudes.

(2) In view of the evidence for the considerable difference existing between "East Antarctica" and "West Antarctica" as regards geological history and age, the meeting recommends that Antarctic expeditions and stations should be encouraged to collect orientated and well-identified rock samples from both parts of the continent with a view to radioactive age determinations and palaeomagnetic measurements, as a contribution to a more detailed study of past Antarctic history.

Cosmic rays

The meeting considered that continuous cosmic ray records in the Antarctic are of the greatest value for the determination of the energy spectrum of primary cosmic rays. The meeting therefore recommends strongly that cosmic ray work in the Antarctic should be continued and even increased in the future.

Biology

The delegates to this Symposium are convinced that the time has come to take positive steps towards the protection and preservation of Antarctic wild life.

The nature of a fauna developed through the joint advantages of an unrivalled food supply at sea and the absence of indigenous enemies on land make such steps essential, both because of the unique characteristics of the birds and mammals concerned, and because of their complete lack of means or instinct of self-preservation while out of the water, and their consequent extreme vulnerability to the mischief of unprincipled men and uncontrolled dogs. It is recognized that the killing of seals, penguins and other creatures is sometimes necessary to provide food for men and dogs, and that the judicious collection of biological specimens is likewise fitting and proper.

However, it must be conceded that each season the resupply operations in support of Antarctic scientific bases bring with them into the Antarctic a number of persons, members of ships' companies and others, who possess a minimum of interest in the natural life and its conservation and who, if not supervised and controlled, have made and will continue to cause serious damage to the flora and fauna. Penguins and other colonial forms readily accessible to predation are easy victims and highly vulnerable fauna types.

It is also true that some careless aspects of modern operations such as the flying of helicopters over penguin rookeries and the pumping of bilges by ships close to shore, with no malice intended, can cause tremendous harm to wild-life populations. Well-intended but ill-advised activities which disturb the natural interplay of population densities, such as the destruction of skuas on the theory that this will benefit the penguins, also leave their marks.

Considering all the above and in recognition of the international aspect of Antarctic scientific activities, it is our firm conviction that the several nations supporting Antarctic stations should take joint steps to ensure the preservation of the Antarctic

flora and fauna and its protection from needless persecution and destruction; and further, that the proper agency to co-ordinate such steps is the Special Committee on Antarctic Research (SCAR).

The meeting therefore recommends that these views be made known to SCAR with the request that it prepare standard regulations which will provide the protection necessary to all forms of Antarctic flora and fauna, and that member nations be exhorted to accede to these regulations and agree to their strict enforcement.

Scientific stations in the Antarctic, 1959 (omitted from SCAR Bulletin No. 2)

Chile

Capitán Arturo Prat

Location: lat. $62^{\circ} 29'$ S., long. $59^{\circ} 38'$ W.

Site: on rock. Method of supply, by sea.

Facilities available: 2 buildings, accommodating 18. Electrical power: 20 kW.

Personnel: Total 9.

Scientific programme: Meteorology, oceanography.

General Bernardo O'Higgins

Location: lat. $63^{\circ} 19'$ S., long. $59^{\circ} 38'$ W.

Site: on rock. Method of supply, by sea.

Facilities available: 2 buildings accommodating 10.

Scientific programme: Meteorology, seismology.

Presidente Gonzalez Videla

Location: lat. $64^{\circ} 49'$ S., long. $62^{\circ} 51'$ W.

Site: on rock. Method of supply, by sea. Seaplane dock.

Facilities available: 1 building accommodating 8.

Scientific programme: Meteorology.

Presidente Arguirre Cerda

Location: lat. $62^{\circ} 56'$ S., long. $60^{\circ} 36'$ W.

Site: on rock. Method of supply, by sea.

Facilities available: 3 buildings accommodating 16.

Personnel: Total 8.

Scientific programme: Meteorology.

France

Iles Kerguelen, Port aux Français

Location: lat. $40^{\circ} 21'$ S., long. $70^{\circ} 13'$ E., 10 m. above sea level.

Site: on rock. Method of supply, by sea.

Climate: Temperature, mean max. 7.82° C., min. 1.4° C.

Wind, mean annual 10.2 m./s., extreme 70 m./s.

Cloudiness, mean annual 6.1.

Facilities available: 41 buildings accommodating 120.

Electrical power: 50 kW., 60 kW. and 120 kW.

Tractors, etc.: 3 bulldozers, 4 Weasels, etc.

Personnel: Leader. Heurgon.

Total: 17 scientists, 90 others.

Scientific programme: Aurora, biology, cosmic rays, geomagnetism, ionosphere, meteorology, oceanography, seismology, ozone.

Iles Kerguelen, Pointe Molloy

Location: lat. $49^{\circ} 21'$ S., long. $70^{\circ} 04'$ E.

Site: on rock. Method of supply, by sea.

Climate: Temperature, mean max. 7.8° C., min. 1.4° C.

Wind, mean annual 10.2 m./s., extreme 70 m./s.

Cloudiness, 6.1.

Facilities available: 2 buildings accommodating 4.

Tractors, etc.: 1 Weasel.

Personnel: Total, 1 scientist, 2 others.

Scientific programme: Seismology.

Nouville-Amsterdam, Camp Heurtin

Location: lat. $37^{\circ} 5'$ S., long. $77^{\circ} 31'$ E.

Site: on rock. Method of supply, by sea.

Climate: Temperature, mean annual 14.1° C., max. 24.3° C., min. 2.8° C.

Facilities available: 14 buildings accommodating 30.

Electrical power, 50 kW.

Tractors, etc.: small-wheeled vehicles.

Personnel: Leader, Commandant Aubert.

Total: 7 scientists, 10 others.

Scientific programme: Biology, meteorology, surface and upper atmosphere.

South Africa

The South African National Antarctic Expedition, 1959, in *Polarbjørn*, reached the coast of Dronning Maud Land on 8 January 1960 and took over "Norway" station, in lat. $70^{\circ} 30'$ S., long. $2^{\circ} 52'$ W. on the 12th. The wintering party, led by H. la Grange, consists of five meteorologists, one geologist and geophysicist, one medical officer, one radio operator and an assistant, and one diesel mechanic. The scientific programme includes geology, geophysics, meteorology and physiology.

RECENT POLAR LITERATURE

This selected bibliography has been prepared by R. J. Adie, Terence Armstrong, T. H. Ellison, Amorey Gethin, J. W. Glen, W. B. Harland, H. G. R. King, Brian Roberts and Ann Savours. Its main field is the polar regions, but it also includes other related subjects such as "applied" glaciology (e.g. snow ploughs and ice engineering). For the literature on the scientific study of snow and ice and of their effects on the earth, readers should consult the bibliographies in each issue of the *Journal of Glaciology*. For Russian material, the system of transliteration used is that agreed by the U.S. Board on Geographic Names and the Permanent Committee on Geographical Names for British Official Use in 1947 (see *Polar Record*, Vol. 6, No. 44, 1952, p. 546).

Reprints of "Recent Polar Literature", from Nos. 37/38 onwards, can be obtained separately (to allow references to be cut out for pasting on index cards) from the Institute, price 2s. 6d. for two reprints. Copies will be sent without charge to organizations with which the Institute maintains exchange arrangements and which notify their wish to receive them. Readers can greatly assist by sending copies of their publications to the library of the Institute.

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OBITUARY

ALEKSANDR IGNAT'YEVICH ANDREYEV, the Soviet historian, died on 12 June 1959 near Leningrad, aged 72. He was a specialist on the archives relating to the history of exploration of northern Russia, and much of his output was in the form of editions of the prime sources. One of his best-known works in this field was *Russian discoveries in the Pacific and in North America in the 18th and 19th centuries*, a collection first published in 1944, and brought out in English by the American Council of Learned Societies in 1952. He also edited Sven Waxell's account of Bering's second expedition (Leningrad, 1940), and was responsible for an edition of Bellingshausen's narrative of his Antarctic voyage of 1819-21 (Moscow, 1949).

ROBERT CAMPBELL was born on 1 January 1881 and died on 19 February 1957. He graduated at Edinburgh University and remained attached to the university as Lecturer and Reader in petrology until his retirement in 1951. Campbell was on two occasions connected with work in the polar regions; he carried out a detailed study of the rocks from Gough Island brought back by the Scottish National Antarctic Expedition 1902-04, and again in 1920 he was appointed Field Geologist to the Scottish Spitsbergen Syndicate and worked for a summer season in Spitsbergen.

ARCHIBALD JOHN CLOWES died in Cape Town on 4 January 1960 at the age of 59. He was educated at Wilson's Grammar School and the Royal College of Science. He was appointed to the scientific staff of the Discovery Investigations in 1924 and served at the Marine Station at South Georgia from 1925 to 1927, except for short periods on RRS *William Scoresby* and in South Africa. He then served in RRS *Discovery II* during her first three commissions in 1929-31, 1933-35 and 1937-39. After serving in the Royal Naval Meteorological Service during the war he returned to the Discovery Investigations in 1946, but left to join the South African Fisheries Laboratory in Cape Town a year later. He made many important contributions to knowledge of the Southern Ocean and of the waters round South Africa.

ROBERT FORDE, who was a member of the crew of the *Terra Nova* during the British Antarctic Expedition, 1910-13, died in Cobh, Co. Cork, on 13 March 1959 at the age of 82. Forde, who was a Petty Officer, RN, at the time of the expedition, was a member of the Shore Party; he took part in two depot-laying journeys and was sledge-master during the Western Journey led by Griffith Taylor in 1911.

JEREMY SMITH was born in 1929 and was killed in a climbing accident on Mont Blanc in August 1959. He was educated at Bryanston School, at King's College, London, and the Macaulay Institute for Soil Science at Aberdeen. While at Aberdeen he took part in an expedition to Spitsbergen. In 1956 he was appointed by the Falkland Islands Dependencies Survey to undertake glaciological investigations in South Georgia on behalf of the Royal Society Committee for the IGY; he returned in 1958.

PAUL WALKER was born in Pasadena, California, on 18 August 1934, and died there on 9 November 1959. He graduated from Occidental College, Los Angeles, in geology. He served as assistant glaciologist in Greenland in the summer of 1956 and then went to the Antarctic with the United States IGY expedition to "Ellsworth" station 1957-58. During 1958 he helped in the compilation and analysis of glaciological and geological data from Antarctica at Ohio State University. In 1959, he was appointed glaciologist with the Ellesmere Island Ice Shelf Expedition (see p. 142) and became ill while working on Ward Hunt Island, off northern Ellesmere Island.

ERRATA

The *Polar Record*, Vol. 9, No. 62, 1959

Page 467, lines 14-16 *to read*: The aircraft used to evacuate the party was a ski-wheel equipped Avitrus (C-123J) of the Strategic Air Command, piloted by Captain J. B. Sullivan, U.S.A.F.

Page 478, line 19. *For* 62° *read* 63°
line 21. *For* 5.3° *read* -6°

The *Polar Record*, Vol. 9, No. 63, 1959

Page 570, line 26, *omit* by Dartmouth College on behalf of
read on a part-time basis as "Eastern Arctic Investigations" by

THIRTY-THIRD ANNUAL REPORT ON THE WORK OF THE SCOTT POLAR RESEARCH INSTITUTE

The General Board beg leave to publish the following Report which they have received from the Director of the Scott Polar Research Institute on the work of the Institute for the year ending 31 July 1959.

Staff and Research Students. Dr S. Evans took up his appointment as Senior Assistant in Research (Polar Studies) on 1 January 1959.

As the requirements of the information service can now be met by a half-time post in Scandinavian languages, the full-time post on Scandinavian studies reverted to half-time on 1 April 1959. Mr P. A. B. Gethin is continuing this work.

Miss J. A. Masterman, the clerical assistant helping the library staff, resigned in February and was replaced by Miss T. A. Deacon.

The following students joined the Institute as registered research students on 1 October 1958:

Mr G. R. Elliston, a graduate of the Department of Geography, University of Cambridge.

Mr J. Hanessian, formerly of the IGY staff of the U.S. Academy of Sciences and a graduate of Syracuse University, N.Y., U.S.A.

Mr J. Tuck, military leader of the U.S. Amundsen-Scott South Pole Station during 1957 and a graduate of Dartmouth College, New Hampshire, U.S.A.

Teaching and Research. (i) *Teaching.* Lectures to candidates for Part II of the Geographical Tripos were given by Dr Armstrong and Dr Roberts on "Polar Problems" (eight lectures) and by Dr Robin on "Polar Ice Sheets" (four lectures).

(ii) *Sea ice studies.* Dr Swithinbank's work on the ice probability analysis of Canadian Arctic waters is now in its final stages. Mr J. A. Heap of the Falkland Islands Dependencies Survey has continued his analysis of sea ice conditions in the waters of the Dependencies. His seasonal forecast of bad ice conditions in the Graham Land region during the 1958-59 summer was substantially correct.

(iii) *Glaciology.* The Institute continues its close collaboration with the British Glaciological Society. The International Geophysical Year Data Centre "C" for Glaciology is housed in the Institute on behalf of the Society, and provides a useful addition to the information available to research workers.

Mr G. R. Elliston has commenced a continuous fourteen-month study of seasonal variations of glacier movement on the Gornergletscher, Switzerland. Assistance with field observations from numerous helpers and financial help from the Mount Everest Foundation, the Royal Geographical Society, and the Department of Scientific and Industrial Research are gratefully acknowledged.

Dr Swithinbank continued work on Antarctic results from Maudheim (1949-52) and Dr Robin has made a further theoretical study of temperature distribution in floating ice shelves.

(iv) *Historical studies.* Dr Armstrong is studying the Russian colonization of northern territories.

Mr King is reviewing source material on the history of the firm of Samuel Enderby and Sons and their part in Antarctic exploration.

Miss Savours continues to locate original manuscript material of early polar interest, and has edited a Scottish whaling journal of 1791 for publication.

Mr J. Hanessian is working on International Law in regard to the political history and development of claims in Antarctica under the supervision of the Professor of International Law.

(v) *Upper atmosphere physics.* Studies of the distribution of certain forms of aurora in time and space have been made by Dr S. Evans in conjunction with Mr J. Paton and Mr G. Thomas of the University of Edinburgh. Both visual and all-sky camera records from the Royal Society Base, Halley Bay, as well as some Trans-Antarctic Expedition results have been analysed.

(vi) *Other studies.* Mr J. Tuck is studying aspects of possible development of Antarctic resources.

Dr Robin is completing work on upper winds over Maudheim in 1950-52.

Information Service. In collaboration with the British Glaciological Society, the Universal Decimal Classification schedules for snow, ice, frozen ground and related subjects have been revised and accepted for use by the Fédération Internationale de Documentation at The Hague. A new "Abstract of the Universal Decimal Classification for use in Polar Libraries" has been prepared and its adoption by many polar organizations throughout the world is greatly facilitating the control and exchange of information. The Institute's classified catalogues are now sufficiently complete to cope with the demands of most visitors.

Dr Roberts has continued his work on Antarctic place-names, with the special object of securing international agreement on their use. Recent activity in Antarctica has increased the volume of work.

Microfilm copies of original journals, notebooks and surveys, etc., have been supplied to research organizations in Canada, New Zealand, Poland, and the United States.

Considerable progress has been made in bringing the catalogue of photographs in the Institute up to date. Around 7000 photographs have been catalogued during the past year.

Information on the organization and functioning of the Scott Polar Research Institute was supplied in different ways to several persons in the U.S.A., where the possible establishment of a Polar Institute has been under consideration for some time.

Visitors using the Institute's collection for short periods included:

Senor José L. Lorenzo, University of Mexico, doing bibliographical research on glaciers in tropical areas.

Mr R. Foster, Falkland Islands Dependencies Survey, working on equipment for polar expeditions.

Miss N. Ferrar, Department of Geography, University of Sheffield, compiling a bibliography on the physiography of Graham Land.

Miss A. Parry, working on a life of Sir William Edward Parry (1790-1855).

Special Committee on Antarctic Research. Dr Robin has been appointed Secretary of the Special Committee on Antarctic Research of the International Council of Scientific Unions. Meetings of the Committee for the purpose of co-ordinating future Antarctic research were held in Moscow in August 1958 and Canberra in March 1959. At the request of the Moscow meeting, the Institute now prepares a *SCAR Bulletin* which is included in each number of the *Polar Record* as from January 1959. It is also reprinted separately for additional distribution, and a copy in Spanish is now being printed in Argentina. The additional work undertaken by the office staff and the editor of the *Polar Record* on SCAR affairs has been much appreciated by the member countries of SCAR.

Visits. SCAR meetings have enabled Dr Robin to pay short visits to the Arctic and Antarctic Research Institute, Leningrad, the Australian National Antarctic Research Expedition headquarters in Melbourne, the Snow, Ice, and Permafrost Research Establishment, Illinois, U.S.A., and Defence Research Board, Ottawa, Canada.

Dr Robin deputized for Sir James Wordie, the reporter for glaciology, at the final

meeting of CSAGI (the Special Committee for the IGY) and the first meeting of its successor, the SCG (Special Committee for Co-operation in Geophysics), in Paris in May 1959.

Dr Armstrong gave two lectures at the École Pratique des Hautes Études, Paris, at the invitation of Monsieur J. Malaurie, Directeur d'Études of the Centre d'Études Arctiques.

Dr Evans joined a research team studying noctilucent clouds from a station in central Sweden in July 1959 at the invitation of the Director of the International Institute of Meteorology in Stockholm.

Dr Robin attended a symposium on Antarctic Meteorology in Melbourne in February 1959 which was organized by the Australian Bureau of Meteorology.

Dr Swithinbank and Mr G. R. Elliston attended a symposium on The Physics of Ice Movement held at Chamonix in September 1958 under the International Association of Scientific Hydrology.

Finance. During the year the Institute received the following sums, which are gratefully acknowledged.

H.M. Government grant-in-aid. The sum of £1000 was received on 12 August 1958 and £500 on 28 April 1959.

Australia. A donation of £638. 1s. 9d. (£A800) authorized by the Australian Cabinet was received on 14 May 1959.

Falkland Islands Dependencies Administration. A grant of £200, being the tenth annual subvention, was made by the Governor of the Falkland Islands on 5 January 1959.

South Africa. A donation of £300 sterling from the South African Government was received on 26 June 1959.

New Zealand. A grant of £100 sterling was received from the New Zealand Government on 24 January 1959.

Canada. £366. 6s. was received on 21 July 1959 under a contractual agreement with the Defence Research Board of Canada covering the year 1958-59.

Publications. Since the last Annual Report was published, three numbers of the *Polar Record*, Nos. 60, 61, and 62, and the Index to Vol. VIII have been issued.

Publications by the staff and research students included the following:

Sea ice north of the U.S.S.R. H.D. 511 (Admiralty, Hydrographic Department, 1958), T. E. Armstrong.

The recording and reporting of floating ice (Polar Record, 1958), T. E. Armstrong.

The Russians in the Arctic (London, Methuen, 1958), T. E. Armstrong.

Antarctica: Current National Interests and Legal Realities (Proceedings of the American Society of International Law, November 1958), J. Hanessian Jr.

Chronological list of Antarctic expeditions, Part 2, up to 1958 (Polar Record, 1958), B. B. Roberts.

The British Contribution to Antarctic ornithology (Ibis, 1959), B. B. Roberts.

Seismic shooting and related investigations (Norwegian-British-Swedish Antarctic Expedition Scientific Results, Vol. 5, Norsk Polarinstitutt, Oslo, 1959), G. de Q. Robin.

The manuscript collection of the Scott Polar Research Institute (Polar Record, 1959), A. M. Savours.

The movement of the ice shelf at Maudheim (Norwegian-British-Swedish Antarctic Expedition Scientific Results, Vol. 3, Norsk Polarinstitutt, Oslo, 1958), C. W. M. Swithinbank.

The morphology of the inland ice sheet and nunatak areas of western Dronning Maud Land and The regime of the ice sheet of western Dronning Maud Land as shown by stake measurements (Norwegian-British-Swedish Antarctic Expedition Scientific Results, Vol. 3, Norsk Polarinstitutt, Oslo, 1959), C. W. M. Swithinbank.

Report on an ice atlas of the North American Arctic in *Arctic sea ice* (National Academy of Sciences—National Research Council, Washington, D.C. Publication 598) [1959], C. W. M. Swithinbank.

Lectures. Lectures were given at the Institute during the Michaelmas and Lent Terms.

1958

18 October "Dog sledging on the Antarctic plateau", by G. W. Marsh.
 8 November "South Pole station", by Dr P. Siple.
 15 November "The Trans-Antarctic Expedition", by Sir Vivian Fuchs.
 29 November "A physiologist in Alaska", by Dr Mary Lobban.
 12 December "Winter cooling of Arctic seas", by Professor D. A. Drogaytsev.

1959

17 January "International Glaciological Expedition to Greenland, 1957-60", by Professor R. Finsterwalder.
 7 February "Beneath the ice of the Arctic Ocean", by Dr Waldo K. Lyon.
 14 February "Trans-polar air routes", by E. Pedersen.
 21 February "Ross Ice Shelf Deformation Project", by Professor J. H. Zumberge.
 28 February "The French expeditions to Terre Adélie for the International Geophysical Year", by B. Imbert.
 13 March "Aspects of social medicine in Swedish Lapland", by Dr Sixten Haraldson.

In addition to the lectures mentioned above there was another series, intended primarily for undergraduates and specialists, on "Technical problems of life and work in polar regions".

1959

23 January "The effect of cold on man", by Dr O. G. Edholm.
 30 January "Selection of methods of exploration", by Sir Vivian Fuchs.
 6 February "Sea ice and travel", by Dr T. E. Armstrong.
 13 February "Supply problems of inland bases", by J. Tuck.
 20 February "Vehicle maintenance at low temperatures", by D. Pratt.
 27 February "Safety and comfort on glaciers", by W. H. Ward.
 6 March "Social problems in a polar environment", by Dr H. E. Lewis.

Friends of the Polar Institute. The membership is now 270, representing a total subscription of about £400 a year. The continued generosity and support of the Friends is greatly appreciated.

Gino Watkins Memorial Fund. It was decided to discontinue the Watkins Award which has normally been made for past achievements, and to devote the available income to making "Watkins Grants" to the leaders of expeditions in the planning stage. Four Watkins grants of £30 each were made in April 1959 to:

Durham University Icelandic Expedition.
 Imperial College, London, Expedition to Jan Mayen.
 Leeds University Swedish Lapland Expedition.
 St Mary's Hospital, London, Spitzbergen Expedition.

In view of the decrease in applications for the loan of equipment from the Gino Watkins Memorial Fund from expeditions outside Cambridge University, the Committee of the Gino Watkins Memorial Fund had reviewed the activities of the Fund. It was felt that the post-war difficulties experienced by expeditions in obtaining suitable equipment were no longer so great, due partly to the accumulation of stocks in certain Universities. The Committee, with the approval of the trustees, therefore decided to cease equipment loans and the existing stock of equipment was sold to individual organizations, which would continue to use the equipment for their own field research and training projects.

Museum. In connexion with the centenary celebrations of The British Ornithologists' Union, an exhibition of Edward Wilson's water-colour studies of Antarctic birds was held during the summer. Many of these paintings had not previously been shown and the exhibition was greatly appreciated by admirers of Edward Wilson's work.

The Friends made three grants towards the cost of museum equipment. A frameless plate-glass display case has been made for the model of the *Fram*. An oak stand

was also made for the display case acquired last year for the *Gjøa*. These two beautiful models were made and presented some years ago by Mr W. H. Honey.

Another grant was used for the re-construction and re-covering of three display screens. The screens were presented to the Institute 2 years ago by the Cambridge Leyden Week Group, and, though light and well designed, required alterations and strengthening. They are more convenient and adaptable than the large screens already in use in the museum.

Accommodation. The Department of Chemistry have helped this year by providing a limited amount of storage space for library and museum equipment in their new Lensfield Road building while the space is not required for their own purposes. In spite of this the Institute is still seriously overcrowded owing to the great increase in the volume of work in polar regions. More space is already needed for the Institute's collections, for the present staff who work under crowded conditions, and for research students and others using the material available in the Institute.

Library. Publications* received during the year numbered 1701. Of these 573 were gifts, 400 were purchased, and 728 received in exchange for the *Polar Record*. The totals include nearly 500 periodicals and serial publications. Maps and charts numbered 693, of which 49 were gifts, 11 purchases, and 633 received in exchange. Over 3397 abstracts of periodical and other literature were compiled by the staff and outside contributors and added to the classified catalogue; 1460 selected abstracts were published in the *Polar Record*.

A grant of £150 from the Smuts Memorial Fund has enabled the library to complete sets of various journals published in the British Commonwealth.

Funds provided by the Friends have enabled the Institute to acquire microfilm or photostat copies of a number of polar manuscripts, listed below with other much valued gifts. The most interesting of these microfilms are the original official records of the United States Exploring Expedition, 1838-42, leader Charles Wilkes. Another fine addition to the manuscripts is a collection of original letters from Sir John and Sir James Clark Ross, presented on permanent loan by A. C. McNeel-Caird, Esq.

The Friends have presented a number of old prints and maps of the polar regions from the seventeenth, eighteenth, and nineteenth centuries.

Gifts. The Institute is most grateful for the publications sent to the Library in exchange for the *Polar Record* and regrets the impossibility of acknowledging each one individually.

We wish to thank the many people and organizations who have kindly presented the following items:

Books and reprints

Dr Otto Abs	J. H. Conover	R. Gessain
G. A. Agronat	J. C. Cook	Dr J. W. Glen
Dr T. E. Armstrong	Dr L. H. N. Cooper	Dr H. Godwin
W. B. Bailey	J. Corbel	Dr R. Goldsmith
S. A. Barnett	Mrs Cruttenden	Dr F. Grandjean
S. Bartl	Dr S. E. Csordas	J. Grierson
E. B. Basden	K. Curry-Lindahl	Professor R. Haefeli
Dr A. D. Belmont	Dr R. J. Cyriax	R. A. Hamilton
Dr G. C. L. Bertram	J. L. Davies	J. Hanessian
K. W. L. Bezemer	Dr W. H. Dawbin	Dr S. Haraldson
Dr R. G. Blackadar	D. L. Dineley	F. Harper
Dr J. M. Boyd	Dr H. I. Drever	Dr H. J. Harrington
Dr W. L. Boyd	Captain R. Eklund	Professor R. D. Hayton
Mrs L. Brooks	Dr M. Evans	Professor J. A. Hildes
Professor V. Kh. Buynitskiy	B. Fristrup	Professor A. Hoel
R. G. Chittleborough	Sir Vivian Fuchs	Dr M. Holdgate
L. K. Coachman	Dr J. Georgi	Dr H. Holtedahl

* Accessions of unpublished material no longer included.

Ing. Hyd. B. Imbert	A. W. Mansfield	G. Seligman
L. Irving	B. Mason	R. P. Sharp
J. D. Ives	Miss J. A. Masterman	Lt. Cmdr. C. C. Shirley
Professor S. V. Kalesnik	M. F. Meier	W. Slabczynski
Dr H. R. Katz	M. Mellor	Professor L. Slaucitajs
F. B. Kennedy	Dr P.-L. Mercanton	A. Stephenson
Professor A. L. Korn	Dr M. M. Miller	R. H. A. Stewart
Dr H. P. Kosack	Dr F. Müller	G. M. Storr
Professor A. Kosiba	R. J. Mutter	Dr C. W. M. Swithinbank
B. A. Kremer	Dr F. Nusser	Mrs V. Tanner
Professor K. Kusunoki	Dr J. F. Nye	J. Terasmae
A. Lansing	Admiral Sir Edward Parry	Professor B. A. Tikhomirov
Dr R. M. Laws	Dr P. Paulian	S. R. Tompkins
Dr J. S. LeBlanc	The Right Reverend the Lord Bishop of Portsmouth	A. F. Treshnikov
Professor G. H. Liljequist	D. L. Pratt	J. Tuck
Dr E. J. Lindgren	Professor A. Renaud	P.-E. Victor
Dr H. Lister	Mrs H. Richardson	Dr C. Wahrhaftig
D. A. Livingstone	Dr S. Richter	Dr A. L. Washburn
Professor L. Lliboutry	Dr B. B. Roberts	R. Webbe
Professor T. Lloyd	Dr G. de Q. Robin	Dr I. Whitaker
Dr M. C. Lobban	J. Robotham	C. B. Wilson
Dr F. Loewe	Captain J. Rouch	Dr O. Wilson
Professor Dr J. Lugeon	Miss A. Savours	Sir James Wordie
Dr N. A. Mackintosh	Dr V. Schytt	Rear-Admiral Noel Wright
Professor J. Malaurie		Dr S. Zavatti

Admiralty. Hydrographic Department	Gough Island Scientific Survey
Air Ministry. Meteorological Office	Hudson Bay Route Association
Aktieselskabet Sydvaranger, Norway	Hull Maritime Museum
American-Scandinavian Foundation, New York	Hull Municipal Museums
Australia. Bureau of Mineralogy, Geology and Physics	Hydrografinen Toimisto, Helsinki
Australia. Commonwealth Scientific and Industrial Research Organization	I.G.Y. World Data Center A. Oceanography
British Association for the Advancement of Science	Imperial Chemical Industries, Limited, London
British Columbia. Department of Lands and Forests. Water Rights Branch	Institute for the Study of the History and Culture of the U.S.S.R., Munich
British Glaciological Society	International Commission on Whaling, London
British Museum (Natural History)	International Council of Scientific Unions.
British North Greenland Expedition, 1952-54	Special Committee on Antarctic Research
California Academy of Sciences	International Geographical Union
Cambridge University Explorers and Travellers Club	International Oceanographical Foundation
Canada. Defence Research Board	Iowa Engineering Experiment Station
Canada. Post Office Department	Islenzki Arbok H.F., Reykjavik
Cariboo Digest Limited, Quensel, B.C.	Japan. Hydrographic Office
Carnegie Institution of Washington	J. Lauritzsen Lines, Copenhagen
Central Library of Hydrometrical Service of the U.S.S.R.	Landlaeknir, Reykjavik
Colonial Office, Directorate of Overseas Surveys	Langlois Herbarium, Catholic University of America
Columbia University Press	McGill University. Meteorological Group
Departamento de Navegación e Hidrografía de la Armada, Chile	Ministry of Agriculture and Fisheries. Fisheries Laboratory, Lowestoft
Director of Meteorology, Melbourne	Minnesota Archaeological Society
Engineering Institute of Canada	Musée de l'Homme, Paris
Expédition Antarctique Belge	National Academy of Sciences, Washington, D.C.
Falkland Islands Dependencies Scientific Bureau	National Institute of Oceanography
Falkland Islands and Dependencies Meteorological Service	National Register of Archives
Fauna Preservation Society, London	New Zealand House, London
Foreign Office Printed Library	Northern Canada Power Commission
	Northern Research Co-ordination Centre, Canada
	Polar Postal History Society of Great Britain
	Provincial Museum of Natural History and Anthropology, Victoria, B.C.

Research Council of Alberta	U.S. Army Attaché, London
Research Institute of Atmospheres, Nagoya University, Japan	U.S. House of Representatives, Committee on Merchant Marine and Fisheries
Robert Bardtenschlager Kg Verlag, Reutlingen	U.S. Naval Research Laboratory
Ross Dependency Research Committee	U.S. Navy. Office of Chief of Naval Operations
Ross Sea Committee	U.S. Office of Naval Research
Royal Anthropological Institute	University of Adelaide. Zoology Department
Royal Ontario Museum	University of Alaska. Geophysical Institute
Royal Society, London	University of Durham Exploration Society
Scripps Institution of Oceanography	University of Oxford. Department of Geology and Mineralogy
Skid-Och Frlufts-Framjandet, Stockholm	University of Washington. Department of Meteorology and Climatology
Soviet I.G.Y. Committee	Victoria Machinery Depot Co. Limited, B.C.
Sydgrønlands Bogtrykkeri, Godthåb	Wärtsilä-Koncernen A/B. Sandvikens Skeppsdocka, Helsingfors
Trust Society for the Furtherance of the Gospel	Wisconsin Conservation Department, Madison
United Nations (New York)	
U.S. Air Force. Cambridge Research Center	
U.S. Air Force. Research Studies Institute	

Maps and charts

H. Evans	Canada. Defence Research Board
Dr H. L. Løvenskiold	Directorate of Overseas Surveys, Tolworth
Professor N. E. Odell	John Bartholomew and Son, Limited
Dr B. B. Roberts	Norsk Polarinstitutt, Oslo
Admiralty Hydrographic Department	Province of Ontario. Department of Mines
Aeronautical Information Service, Reykjavik Airport	Royal Board of Civil Aviation, Stockholm
Australia. Department of External Affairs. Antarctic Division	South African Hydrographic Office
	Sveriges Geologiska Undersökning

Manuscripts, etc.

Plan of Mawson, Mac-Robertson Land, Antarctica, 1957; charts of the Australian sector of the Southern Ocean, showing soundings and tracks of A.N.A.R.E. vessels, 1954-58	Antarctic Division, Department of External Affairs, Melbourne
Plan of Athabasca, Alberta, 1956	Alberta. Department of Highways
Plan of Anchorage, Alaska, 1959	Anchorage, Alaska. Office of the City Engineer
Draughts of the icebreaker <i>Labrador</i> , 1955	Canada. Department of National Defence
Plan of Fairbanks, Alaska, 1959	Fairbanks, Alaska. Office of the City Engineer
Deck log books of the <i>Fitzroy</i> , antarctic seasons 1944-47	Falkland Islands Company, Limited
Photocopies of hut plans of the Falkland Islands Dependencies Survey, 1956	Falkland Islands Dependencies Survey
Microfilm or photostat copies of the following documents: Records of the U.S. Hydrographic Office relating to the United States Exploring Expedition, 1838-42; journal kept by George Kerr aboard the <i>Christian</i> of Aberdeen 'on a voyage to the northern whale fishery, 1791'; journals and log books kept by R. Amundsen during the voyage of the <i>Gjøa</i> through the Northwest Passage, 1903-07; journal kept by John Biscoe during his antarctic voyage of 1830-33; letter from E. A. Wilson to Dr Sharpe, 24 February 1903, written during the British National Antarctic Expedition, 1901-04; log of the <i>Nimrod</i> 1908, 1908-09 kept by J. K. Davis during the British Antarctic Expedition, 1907-09; letters from Sir John and Lady Franklin in the Alexander Turnbull Library, New Zealand; log book of the <i>Asia</i> kept by Sylvanus	Friends of the Polar Institute

Crosby during a voyage to Iles de Kerguelen, 1791-94; log book of the <i>Eliza Scott</i> kept by John Balleny, 1838-39; log of <i>Beaufroy</i> , 1824-26; papers concerning J. Weddell (1787-1834)	N. V. Haarlemsche Scheepabouw Maatschappij, Haarlem
Draughts of Chilean ice-strengthened vessel <i>Piloto Pardo</i> , 1956	Commander A. E. Harbord, R.N.
Navigation work book kept by A. E. Harbord aboard <i>Nimrod</i> during the British Antarctic Expedition, 1907-09	
Carbon typescript of the author's <i>Svalbards historie, 1898-1958</i> , in course of publication 1959	Professor Adolf Hoel
Maps of North Lyngen, Troms, made from a plane table survey by the British Lyngen Expedition, 1952	J. N. Hutchinson
Plan of Schefferville, Quebec, 1958	Iron Ore Company of Canada
Letters from Sir John and Sir James Clark Ross to various correspondents. On permanent loan	A. C. McNeel-Caird
Microfilm of the journal kept by Sir William Edward Parry in Australia, 1829-34	Trustees of the Mitchell Library, Sydney
Letters written by A. B. Armitage, C. W. R. Royds, and R. F. Scott to Sir Arthur Moore, during the British National Antarctic Expedition, 1901-04	Miss M. Moore
Letter from E. A. Wilson to Mrs Caroline Oates from the last camp of the Pole party during the British Antarctic (<i>Terra Nova</i>) Expedition, 1910-13	Miss V. Oates
Copy of draughts of H.M. barque <i>Endeavour</i> , 1768	Dr B. B. Roberts
Letter from W. S. Bruce to Lady Emily Shackleton, 7 February 1916	Dr V. B. Scheffer
Copy of the journal kept by Captain W. D. Shields commanding the fleet oiler <i>Hopemount</i> , during a voyage from Tyneside along the Northern Sea Route to Tiksi and return, 1942-43	Captain W. D. Shields
Original meteorological observations made by the British Graham Land Expedition, 1934-37	A. Stephenson
Microfilm of the journal kept by Harold McNeish during the British Imperial Trans-Antarctic Expedition, 1914-16	Walter Sullivan

Photographs, negatives, slides, films, etc.

T. E. Armstrong	F. E. Wooden
S. Bártl	Lieutenant V. C. Wynne-Edwards, R.N.
V. D. Carse	Amphibious Training Command, U.S. Pacific Fleet
H. B. Dickens	Australian National Antarctic Research Expeditions
G. Hattersley-Smith	Canada Geographical Survey
J. A. Heap	Explorers Club
T. V. Hodgson (bequest)	Falkland Islands Dependencies Scientific Bureau
Dr H. Lister	U.S. Navy
Dr Terris Moore	Wärtsilä-Koncernen A/B
S. A. Shingler	Western Electric Company
Dr H. Simpson	
Dr Paul A. Siple	
C. B. Wilson	

Museum exhibits, equipment, etc.

Photograph of H.M. Queen Elizabeth II, presented by her to the Trans-Antarctic Expedition, and carried during crossing of Antarctica, 1957-58	Trans-Antarctic Expedition
Union Jack carried by U.S. Committee on Interstate and Foreign Command during flights over North and South Pole, 1957	Andrew Stevenson
Impression from copper seal commemorating the voyage of the <i>Jane</i> and the <i>Beaufroy</i> , 1823. The seal, now in the National Maritime Museum, probably belonged to James Weddell	Sir James Wordie

Folio volume of prints entitled *Winter Sketches in Lapland by Captn. Brooke, drawn on stone by D. Dighton and J. D. Harding*, London, 1827; lithograph entitled *Niagungitok the Esquimaux Indian from Baffins Bay* (n.d.); engraving entitled *Rain-deer sledges used in Lapland* (n.d.); lithograph entitled *Lapland. Costume of the Laplanders*, London 1813; lithograph entitled *Sjockjocks Lappskan. Sigga Pâlsdotter Sunnak från Luleå Lappmark... 1801*; steel engraving entitled *The manner of Esquimaux Indians kindling a fire* (n.d.); steel engraving entitled *View of the Racehorse and Carcass*, London, 1774; steel engraving entitled *Curious prospect of an iceberg in the island of Spitsbergen*, London, 1774.

Friends of the Polar Institute

G. DE Q. ROBIN, *Directo*

NOTICES

The *Polar Record* is published in January, May and September each year. Contributions, also books and papers for listing in the bibliography of "Recent Polar Literature", should be addressed to the Editor, Scott Polar Research Institute, Lensfield Road, Cambridge, England.

Every effort is made to enable authors of articles to receive proofs, which they are requested to return without delay. Proofs of notes are not normally submitted to authors, except when especially requested.

Twenty-five reprints of articles are supplied free to authors; additional copies, which are provided at cost price, should whenever possible be requested on submitting the contribution. Reprints of notes are not normally supplied.

Correspondence arising out of notes and articles is welcomed.

The Scott Polar Research Institute is a signatory of the Royal Society's "Declaration on fair dealing in regard to copying from scientific periodicals". Details of the Declaration may be obtained upon application from the offices of the Royal Society, Burlington House, London, W. 1.

The cover of the journal is from a photograph taken in Terre Adélie by Expéditions Polaires Françaises.

PUBLICATIONS FOR SALE AT THE SCOTT POLAR RESEARCH INSTITUTE

Scientific Reports of the Terra Nova expedition, 1910-13

Reports dealing with meteorology, terrestrial magnetism, gravity determination, aurora observations, physiography and miscellaneous data are still available. For a detailed list, and prices, see the inside back cover of the *Polar Record*, No. 44.

Back issues of the Polar Record

A few sets of the *Polar Record*, Volumes 1-5 (Nos. 1-40), including indexes, are available, price £60.

Some separate issues are available price seven shillings and sixpence each (or fifteen shillings each for double numbers); from No. 58 the price is ten shillings and sixpence.

Indexes for Volumes 1-5 are five shillings each and for later volumes are ten shillings each.

Reprints of "Recent Polar Literature", from Nos. 37/38 onwards, are two shillings and sixpence for two reprints for each issue.

Reprints of "Illustrated Ice Glossary", by Terence Armstrong and Brian Roberts, from Volume 8, No. 52, 1956, and Volume 9, No. 59, 1958, are five shillings each.

Reprints of "Chronological list of Antarctic expeditions", by Brian Roberts, from Volume 9, Nos. 59 and 60, 1958, are seven shillings and sixpence each.

An illustrated descriptive pamphlet entitled *The Scott Polar Research Institute* is two shillings and ninepence.

Prices are subject to alteration without notice.

“FRIENDS OF THE POLAR INSTITUTE”

This association was established in March 1946 with two objects in view: first to provide a means whereby those interested in the promotion of polar exploration and research might assist the Scott Polar Research Institute, and secondly to keep members in touch both with the Institute and with present polar activities. Members receive the Annual Report of the Committee of Management, which describes the work and progress of the Institute, and the Annual Report of the “Friends of the Polar Institute”.

The minimum annual subscription is one guinea. British taxpayers who are able to subscribe by covenanted agreement for a period of seven years will be giving additional assistance to the Institute. “Friends” are asked to subscribe separately to the journal of the Institute, the *Polar Record*.

The “Friends” have been the means of giving very valuable help to various sides of the Institute’s work. Subscriptions are used principally for making accessions to the Museum and Library, for providing furniture and equipment, and for special needs which cannot be met from other sources.

SUBSCRIPTION TO THE *POLAR RECORD*

The *Polar Record* may be obtained direct from the Scott Polar Research Institute, Lensfield Road, Cambridge, England, or through any bookseller. The subscription is thirty-one shillings and sixpence a year, or ten shillings and sixpence a single copy, post free.